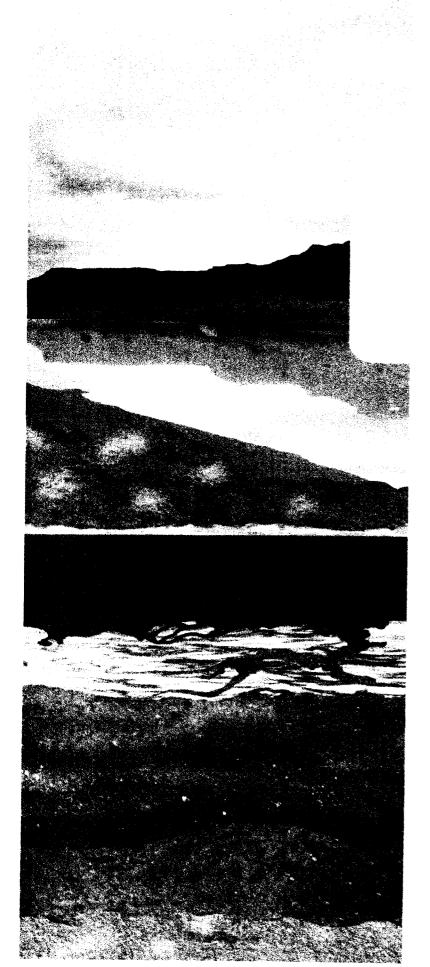
#### BROWNFIELDS ASSESSMENT. OCALA, FLORIDA FOIA 2019-003937

FOLDER NUMBER	BRIEF DESCRIPTION	
424-157	Former Shill Car Wash 9/28/04	
	Intro	
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#### Andreyev Engineering, Inc.

- **▼** Groundwater
- **▼** Environmental
- ▼ Geotechnical
- ▼ Materials Testing

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QUALITY ASSURANCE PROJECT PLAN REVISION 1.0 FORMER SHELL CAR WASH 817 NORTH PINE AVENUE MARION COUNTY, COUNTY, FLORIDA

September 28, 2004

#### **QUALITY ASSURANCE PROJECT PLAN**

#### Revision 1.0

for the

#### BROWNFIELD PHASE II ESA - FORMER SHELL CAR WASH 817 NORTH PINE AVENUE OCALA, MARION COUNTY, FLORIDA

prepared for

#### RENEW OCALA-A BROWNFIELD REDEVELOPMENT PROGRAM

P.O. BOX 1270 OCALA, FLORIDA 34478

prepared by

ANDREYEV ENGINEERING, INC. 4055 ST. JOHNS PARKWAY SANFORD, FLORIDA 32771

(407) 330-7763

PROJECT NO. EGEN-04-0080

**September 28, 2004** 

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#### Form A

#### Title and Approval Page

Document Title: Quality Assurance Project Plan - Former S	Shell Car Wash, Ocala, Florida
Prepared by: Andreyev Engineering, Inc.	
Address and Telephone Number: 4055 St. Johns Parkway. (407) 330-7763	Sanford, Florida, 32771, (407)
Day/Month/Year: 28 September, 2004	
Project Manager	Signature
Jan	7 / 1200
Project OA Office	Printed Name/Date
Project QA Officer_	Signature
RAJNI	Printed Name/Date
U.S. EPA Project Manager Approval:	
	Signature
	Printed Name/Date
U.S. EPA QA Officer Approval:	0:1
	Signature
	Printed Name/Date

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#### I.0 INTRODUCTION AND PURPOSE

#### Form A - Title and Approval Page

The preceding page contains the Title and Approval Page for the Quality Assurance Project Plan for the Brownfield Phase II Environmental Site Assessment (ESA) to be conducted for the subject site. This is the first revision of the original document, Revision 0, which was dated June 15, 2004. On June 23, 2004, the U.S. EPA Office of Quality Assurance and Data Integration, on June 23, 2004 issued a memorandum which contained review comments for Revision 0, which indicated that Revision 0, was "Conditionally approved, comments must be addressed, resubmittal required." As a result, Revision 1.0 has been prepared to address the comments contained in the June 23, 2004 memorandum.

#### I.a Overview and Purpose of Brownfield Phase II ESA Activities

The purpose of this project is to conduct a Phase II ESA for the subject site, located at 817 North Pine Avenue, Ocala, Marion County, Florida. A Phase I ESA was completed for the subject site by HSW on October 23, 2003, which indicated that the subject site previously contained a car wash facility and gasoline station. The Phase I ESA concluded that the subject had "recognized environmental conditions in connection with the subject property, specifically subsurface contamination related to the petroleum releases on January 30, 1989, and November 4, 1991." As a result, AEI was authorized on February 27, 2004 by Renew Ocala, a Brownfield Redevelopment Program (referred to hereafter as "Renew Ocala") to conduct Phase II ESA activities for the subject site. The purpose of the Phase II ESA to be conducted by AEI is to determine if the soil and groundwater at the subject site has been adversely impacted by the previous use of the subject site as a car wash and gasoline station. The purpose of the Phase II ESA is to determine the presence of solvents and petroleum constituents in the soil and groundwater at specific locations on-site, and allow decisions to be made concerning future re-development of the subject site. The Phase II ESA activities approved by Renew Ocala are the first phase of a Brownfields Site Assessment, which are designed to identify the highest concentrations in the identified source areas, and include the following:

- Soil Boring Investigation: A soil boring investigation will be conducted to determine the presence of constituents associated with the former gasoline station and car wash operation in the unsaturated zone of the subject site. Six soil borings will be installed to 30 feet, and the soil samples from each soil boring will be screened in the field for the presence of petroleum and solvents with an organic vapor analyzer (OVA). Three soil samples will be collected from specific locations for petroleum parameters and one sample will also be analyzed for solvent parameters.
- Groundwater Investigation: A groundwater investigation will be conducted to determine the
  presence of constituents associated with the former gasoline station and car wash in the
  groundwater at six specific locations. Six monitoring wells will be installed to 40 feet. Six
  groundwater samples will be collected for solvent and petroleum parameters and total lead.
  The monitoring wells will also be used to determine the direction of groundwater flow beneath
  the subject site.

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• Data Analyses and Report Preparation: Upon completion of the soil and groundwater investigations, a quality control analysis will be conducted to insure that each task meets the data quality objectives, and that no errors have occurred in the field, laboratory, of office. The report will evaluate the soil and groundwater for the parameters detected with respect to levels specified in Chapter 62-777, Contaminant Cleanup Target Levels, Florida Administrative Code (FAC), Florida Department of Environmental Protection, 1999.

#### I.b Quality Assurance Overview and QAPP Preparation

Andreyev Engineering Inc. (AEI) understands that this project should provide site specific data to evaluate the subject site with respect to applicable regulations and make decisions about the potential redevelopment of the Former Shell Car Wash property. AEI also understands that quality assurance (QA) and quality control procedures are applicable to the Phase II Brownfield Site Assessment. Quality assurance is the management activities involving planning, implementation, assessment reporting and quality improvement to ensure that the Brownfield Phase II Site Assessment meets the desired goals. Quality control is the overall system of technical activities that measure the performance of the processes utilized in this Brownfield Phase II Site Assessment against defined standards to verify that they meet predefined requirements.

In preparing this QAPP, Revision 1.0, AEI has reviewed a number of U.S. Environmental Protection Agency (EPA) and Florida Department of Environmental Protection (FDEP) documents which apply to conducting sampling activities at Brownfield sites. The applicable documents are as follows:

- a. U.S. Environmental Protection Agency, Office of Solid Waste Emergency Response, EPA 540-R-98-038, Quality Assurance Guidance for Conducting Brownfields Site Assessments, September, 1998.
- b. U.S. Environmental Protection Agency, Region 4, Quality Management Plan for Region 4, Revision 2, May 2003.
- c. Florida Department of Environmental Protection, <u>Chapter 62-160</u>, <u>Quality Assurance</u>, Florida Administrative Code. A copy of this document is included in **Appendix A**, and the following specific items apply:
  - Item 62-160.110(6): This item indicates that "If specifically required by the United States Environmental Protection Agency (EPA) for activities conducted for or funded by EPA, Quality Assurance Project Plans (QAPPs) shall be prepared in accordance with EPA Requirements for Quality Assurance Project Plans, EPA QA/R-5' (EPA/240B-01/003 March 2001), which is incorporated by reference in Rule 62-160.800, FAC. These QAPPs will be reviewed and approved by the appropriate EPA office or delegated authority."
  - Item 62-160.110(7): This item indicates that "This chapter supports the Quality Assurance Management Plan required by the EPA for any environmental programs funded in part or in whole by the EPA, as specified in EPA Order 5360.1 A2, dated May 5, 2000, which is incorporated in rule 62-160.800, F.A.C."

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d. Florida Department of Environmental Protection Memorandum, Notice to Persons Responsible For Brownfield Site Rehabilitation and Contractors Performing Work Pursuant to Section 376.81, F.S.. This memorandum indicated that all fieldwork conducted after April 9, 2002 should be conducted in accordance with Chapter 62-160, FAC. A copy of this memorandum is included in **Appendix B.** 

- e. Florida Department of Environmental Protection Memorandum, Rule 62-160, Quality Assurance, dated August 6, 2002. This memorandum was issued by Edwin J. Conklin, Director, Resource Assessment and Management, which summarized the various new procedures implemented under Chapter 62-160, F.A.C. A significant applicable item is the requirement that all laboratories be certified by the Florida Department of Health (DoH) under the National Environmental Laboratory Accreditation Program (NELAP) standards. A copy of this memorandum is also included in **Appendix B**.
- f. U.S. Environmental Protection Agency, Science and Ecosystem Support Division, Office of Quality Assurance and Data Integration Memorandum, Quality Assurance Project Plan Review and Comments, Denise Goddard, June 23, 2004. A copy of this memorandum is also included in Appendix B.

#### I.c Site Location and Description

According to information available from the Marion County Property Appraiser's website, the subject site contains .76 acres of vacant land, with an address of 817 North Pine Avenue, Ocala, and is owned by Central Florida LLP. The information available from the Marion County Property Appraiser's office is contained in **Appendix C**. The subject site is located immediately to the east of North Pine Avenue (which is also U.S. Highway 441) and is located in Section 7, Township 15 South, Range 22 East, as shown on the U.S. Geological Survey (USGS), "Ocala West", Florida Quadrangle Map, included as **Figure 1**. Based on a site visit by J. Jarmolowski of AEI on March 26, 2004, no buildings are present and the subject site contains concrete and asphalt areas. Site photographs and an aerial photograph are included in **Appendix D**. It should be noted that the address of the subject site has been identified as 819 NW Pine Avenue in other documents reviewed by AEI. For the purposes of this report, the address listed on the Marion County Property Appraiser's website has been utilized.

#### I.d Phase I ESA, October 2003, and Previous Technical Information

As indicated in Section Ia, a Phase I ESA was completed by HSW, on October 28, 2003, and the text from this Phase I ESA is included in **Appendix E**. In addition, AEI was provided additional technical information concerning the subject site from Mr. George Roberts of Renew Ocala. The following summary information is provided:

- The Phase I ESA report indicated that the subject site was a former Shell Car Wash, and indicated that petroleum discharges were reported on January 30, 1989, and November 4, 1991.
- Review of the FDEP STI database indicates that the subject site previously contained three 10,000-gallon underground storage tanks (USTs) and one 275-gallon UST, which are registered as being removed.

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Based on review of a Closure Assessment Form dated February 1992, the three 10,000-gallon USTs contained gasoline and the 275-gallon UST contained kerosene. Review of a site plans prepared by Gurr & Associates in 1991, and Florida Environmental Compliance in 1994, indicated the presence of two pump islands and two UST areas. The three 10,000-gallon USTs were located in the northern portion of the site and the 275-gallon UST was located adjacent to the west of the former building on-site.

Based on information provided to AEI by Mr. George Roberts of Renew Ocala, the former car wash operations were conducted in the eastern portion of the former building, as shown in Figure 2.

#### Source Identification and Investigation

Based on the information above, four potential sources have been identified for the subject site, and will be investigated by the Brownfield Phase II ESA as follows:

Source Area #1:

The former car wash building, located in the northeast portion of the

subject site.

Source Area #2:

The former UST area located in the northern portion of the site, which

contained three, 10,000-gallon unleaded gasoline USTs.

Source Area #3:

Two former pump islands, associated with the former gasoline USTs,

located in the central portion of the subject site.

Source Area #4:

A former 275-gallon kerosene UST, located immediately to the west of

the former car wash building.

#### l.e **DQO Overview and Evaluation**

The U.S. Environmental Protection Agency requires that all Federally funded environmental monitoring and measurement efforts participate in a centrally managed quality assurance program. AEI understands that the Brownfields site assessment team generating data under this quality assurance program has the responsibility to implement minimum procedures to ensure that the precision, accuracy and completeness of its data are known and documented. The Data Quality Objectives (DQO) process has been incorporated by AEI for this Brownfield Phase II ESA, which will allow AEI to determine the level of data quality needed for specific data collection activities. AEI has incorporated the DQO elements into the various forms contained in Section II, and Section III. In addition, the subject site has been evaluated with respect to the seven steps of the DQO process, as follows:

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#### Step 1 - Problem Definition:

The subject site has been previously used as a car wash and gasoline station. The subject site is currently undeveloped and under consideration for re-development as an indoor soccer center, with a proposed 20,000 square foot metal frame building. A discharge of unleaded gasoline was reported on January 30, 1989, and a discharge of kerosene was reported on November 4, 1991. As indicated in Section 1.d above, the subject site has four specific source areas which require investigation to determine if the soil and groundwater has been impacted by solvents and/or petroleum constituents, before the site is re-developed. If any solvents and/or petroleum constituents are detected in the soil or groundwater, they must be evaluated with respect to applicable criteria specified in Chapters 62-777 and 62-770, FAC. The evaluation of the levels of the solvents and/or petroleum constituents will determine the various decisions that may be made with respect to the subject site. There are currently no on-site human or environmental receptors. There are no off-site human or environmental receptors within 500 feet of the subject site.

#### Step 2 - Identify the Decision:

The results of the Brownfield Phase II ESA will determine if levels of solvents and petroleum parameters are present in the soil and groundwater at the specific source areas investigated. The decisions for this site will be as follows:

- a) Are Any Interim-Short Term Remedial Actions Needed? This includes the determination of the presence of soil contamination which is exposed that may impact other areas of the subject site, offsite properties, or potentially impact the surficial aquifer.
- b) Are Interim Soil Removal Activities Needed? If it is determined that soil contamination is present above acceptable criteria and is "excessively contaminated" in any of the four source areas, then a decision may be made for removal of soil for specific source areas.
- c) Is Free Product Removal Needed? If the presence of any petroleum free product is detected in the monitoring wells installed in the source areas, is the removal of free product needed? Chapter 62-770.300, FAC, requires the removal of any petroleum free product within three days of discovery.
- c) Groundwater Contamination: Determine the presence of any elevated parameters of solvents or petroleum constituents associated with the source areas, and the potential for these parameters to impact site redevelopment, and off-site migration, and potential impact on adjacent properties.
- d) Determine the Need for Additional Site Assessment Activities: The analyses for soil and groundwater laboratory analyses obtained the source areas will be used to determine the need for delineation of any solvent or petroleum groundwater plumes, the potential for these parameters to impact site redevelopment, and determine the for off-site migration and potential impacts on adjacent properties.

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#### Step 3 - Identify the Inputs to the Decision:

This step involves identification of the information necessary to make informed, defensible decisions. As part of this project, the information necessary to make informed decisions will consist of the following:

a) Soil Screening Results: The soil screening results will be obtained by analyzing soil samples with an Organic Vapor Analyzer (OVA) for soil samples obtained as a result of Standard Penetration Tests (SPTs). The OVA results will be reported in parts per million (PPM), and will be utilized to determine the presence of either solvents and/or petroleum constituents. The soil screening results will be evaluated with respect to FDEP criteria for petroleum constituents. Since the subject site previously contained unleaded gasoline underground storage tanks and one 275-gallon kerosene UST, there are different action levels for each type of petroleum product. The various action levels for the sources of the subject are as follows:

#### Source Area #1 - Former Car Wash Building

Field Screening - OVA Criteria

0-100 ppm:

For samples which detect 0 to 100 ppm, these samples will be considered to be below

the applicable criteria for the presence of solvent constituents.

100-500 ppm: For samples which detect 100 to 500 ppm, these samples will be considered to be "contaminated", and will be identified for laboratory sampling to identify specific

parameters and levels present.

#### Source Area #2 - Former Gasoline UST Pit

Field Screening - OVA Criteria

0-100 ppm:

For samples which detect 0 to 100 ppm, these samples will be considered to be below

the criteria for additional sampling.

100-500 ppm: For samples which detect 100 to 500 ppm, these samples will be considered to be "contaminated", and will be identified for laboratory sampling to identify specific

parameters and levels present.

>500 ppm

For samples which are detected greater than 50 ppm, these samples will be identified as "excessively contaminated", and will be identified for laboratory sampling to identify specific parameters and levels present. In addition, the samples which are greater than 500 ppm will be used as part of the determination for soil removal activities prior

to redevelopment.

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#### Former Gasoline Pump Islands

Field Screening - OVA Criteria

0-100 ppm:

For samples which detect 0 to 100 ppm, these samples will be considered to be below

the criteria for additional sampling.

100-500 ppm: For samples which detect 100 to 500 ppm, these samples will be considered to be "contaminated", and will be identified for laboratory sampling to identify specific

parameters and levels present.

>500 ppm

For samples which are detected greater than 50 ppm, these samples will be identified as "excessively contaminated", and will be identified for laboratory sampling to identify specific parameters and levels present. In addition, the samples which are greater than 500 ppm will be used as part of the determination for soil removal activities prior to redevelopment.

#### Former Kerosene UST

Field Screening - OVA Criteria

0-10 ppm:

For samples which detect 0 to 10 ppm, these samples will be considered to be below

the criteria for additional sampling.

10-50 ppm:

For samples which detect 10 to 50 ppm, these samples will be considered to be "contaminated", and will be identified for laboratory sampling to identify specific

parameters and levels present.

>50 ppm

For samples which are detected greater than 50 ppm, these samples will be identified as "excessively contaminated", and will be identified for laboratory sampling to identify specific parameters and levels present. In addition, the samples which are greater than 50 ppm will be used as part of the determination for soil removal activities prior

to redevelopment.

#### B) Soil Laboratory Analytical Results

#### Source Area #1 - Former Car Wash Building

A soil sample will be collected from the area occupied by the former building and will be analyzed for EPA Method 8021 (halogens). The parameters detected will be evaluated to those identified in Chapter 62-777, FAC, Table II, Soil Cleanup Target Levels, either for "Direct Exposure-Residential", or "Leachability Based on Groundwater Criteria", which ever is lower.

#### Source Area #2 - Former Gasoline UST Pit

A soil sample will be collected from the former UST pit, and will be analyzed for EPA Method 8021 (volatile aromatics). The parameters detected will be evaluated to those identified in Chapter 62-777,

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FAC, Table II, Soil Cleanup Target Levels, either for "Direct Exposure-Residential", or "Leachability Based on Groundwater Criteria", which ever is lower.

#### Source Area # 3 - Former Gasoline Pump Islands

A soil sample will be collected from the area occupied by the former gasoline pump islands and will be analyzed for EPA Method 8021 (volatile aromatics). The parameters detected will be evaluated to those identified in Chapter 62-777, FAC, Table II, Soil Cleanup Target Levels, either for "Direct Exposure-Residential", or "Leachability Based on Groundwater Criteria", which ever is lower.

#### Source Area # 4 - Former Kerosene UST

A soil sample will be collected from the former 275-gallon kerosene pit, and will be analyzed for EPA Method 8100 (Polynuclear Aromatic Hydrocarbons). The parameters detected will be evaluated to those identified in Chapter 62-777, FAC, Table II, Soil Cleanup Target Levels, either for "Direct Exposure-Residential", or "Leachability Based on Groundwater Criteria", which ever is lower.

#### C) Groundwater Laboratory Analytical Results

#### Source Area #1 - Former Car Wash Building

A groundwater sample will be collected from the area occupied by the former building and will be analyzed for EPA Method 601 parameters. The parameters detected will be evaluated to those identified in Chapter 62-777, FAC, Table I, Groundwater and Surface Water Cleanup Target Levels, for "Groundwater Criteria".

#### Source Area #2 - Former Gasoline UST Pit

Two groundwater samples will be collected from the area which contains the former gasoline UST pit and will be analyzed for EPA Method 601 and 602 parameters and total lead. The parameters detected will be evaluated to those identified in Chapter 62-777, FAC, Table I, Groundwater and Surface Water Cleanup Target Levels, for "Groundwater Criteria".

#### Source Area # 3 - Former Gasoline Pump Islands

One groundwater sample will be collected from the area which contains the former gasoline pump islands and will be analyzed for EPA Method 601 and 602 parameters and total lead. The parameters detected will be evaluated to those identified in Chapter 62-777, FAC, Table I, Groundwater and Surface Water Cleanup Target Levels, for "Groundwater Criteria".

#### Source Area # 4 - Former Kerosene UST

One groundwater sample will be collected from the area which contains the former 277-gallon kerosene UST and will be analyzed for EPA Methods 601, 602, 8310, TPH, and total lead. The parameters detected will be evaluated to those identified in Chapter 62-777, FAC, Table I, Groundwater and Surface Water Cleanup Target Levels, for "Groundwater Criteria".

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#### Step 4 - Define Boundaries of the Study

This step involves identification of the spatial and temporal boundaries which apply to the subject site. The following items apply:

Site Boundary: As indicated in other sections of this QAPP, the subject site contains .76 acres.

Areas of Investigation: As indicated other sections of this QAPP, there are four source areas which are being investigated, which are identified as follows:

Source Area #1:

The former car wash building, located in the northeast portion of the

subject site.

Source Area #2:

The former UST area located in the northern portion of the site, which

contained three, 10,000-gallon unleaded gasoline USTs. This area is

Source Area #3:

Two former pump islands, associated with the former gasoline USTs,

located in the central portion of the subject site.

Source Area #4:

A former 275-gallon kerosene UST, located immediately to the west of

the former car wash building.

**Determination of Unsaturated Zone:** As indicated in other sections of this QAPP, the estimated depth to the upper surface of the water table is 30 feet. The seasonal fluctuation in the groundwater table is approximately 2 feet. Based on this information, the unsaturated zone for this project is defined as the interval from 0 to 28 feet, and the "smear zone" associated with the season fluctuation of the water table is from 28 to 30 feet below land surface. Therefore, the unsaturated zone for this project is from 0 to 28 feet below land surface.

#### Area Applicable to Soil Investigation:

For each of the four source areas, consideration has been given to the characteristics of each area, as follows:

Source Area #1: The former car wash building has been removed, and does not contain pavement. The soil lithology beneath the former car wash building will be determined by split spoon soil sampling from the boring, and samples will be screened with an OVA in 5 ft. intervals, down to the upper surface of the water table, which is expected to be at approximately 30 feet below land surface. For this area, any solvent contamination is expected to be directly beneath the former car wash building, in the upper 10 feet, due to the operation of the former car wash on the surface. One soil laboratory sample is proposed to determine the presence of solvent parameters, from a depth of 5 feet. The interval from 10 feet to 30 feet is not expected to be adversely impacted. However, samples will be collected in five foot intervals to verify no OVA readings are detected above 10 ppm down to the water table.

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Source Area #2: The former UST area located in the northern portion of the site, which contained three, 10,000-gallon unleaded gasoline USTs. The three former USTs were removed, and back-filled. The surface of this area contains concrete. Based on this information, the expected impacted areas is on the perimeters and bottom of the UST pit. However, in order to account for any unanticipated conditions, split spoon soil samples will be collected from two auger borings installed in the former UST pit from the surface to the upper surface of the water table, at approximately 30 feet, and will be analyzed for petroleum vapors with an OVA. One laboratory soil sample will be collected from a specific depth based on the OVA results.

Source Area #3: Two former pump islands, associated with the former gasoline USTs, located in the central portion of the subject site. The two pump islands have been removed and the surface of the area where the pump islands were removed contains dirt. The pump islands were located on the surface, and the expected impacted area of soil is directly beneath each pump island. Split spoon soil samples will be collected to the upper surface of the water table, at approximately 30 feet. Samples will be obtained in 5 ft intervals for OVA analysis, and one laboratory soil sample will be collected from a specific depth based on the OVA results.

Source Area #4: The former 275-gallon kerosene UST was located immediately to the west of the former car wash building. The 275-gallon UST has been removed, the tank pit backfilled, and this area contains concrete. Based on this information, the expected impacted areas is on the perimeters and bottom of the UST pit. However, in order to account for any unanticipated conditions, split spoon soil samples will be collected from one auger boring installed in the former UST pit from the surface to the upper surface of the water table, at approximately 30 feet, and will be analyzed for petroleum vapors with an OVA. One laboratory soil sample will be collected from a specific depth based on the OVA results.

#### Area Applicable to Groundwater Investigation:

As indicated in other sections of this QAPP, six monitoring wells will be installed to investigate the four source areas. As a result, if solvents or petroleum constituents are detected in any of the monitoring wells, the horizontal extent of any plume or plumes will not be delineated. However, the results will be utilized for additional Brownfield Site Assessment Activities to determine the locations of monitoring wells to determine the full horizontal extent of any hydrocarbon or solvent plumes. The property boundaries are the temporal boundaries for the groundwater investigation.

#### Step 5 - Development of a Decision Rule

The purpose of developing a Decision Rule is to "integrate the output from the previous steps of the DQO process into a statement that estimates the parameter(s) of interest, delineates the scale of decision making, specifies the action level, and describes the logical basis for choosing among alternative actions." The following items are provided:

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#### Soil Investigation, Four Source Areas

Alternative A - The results of the soil investigation for each source area will be evaluated with respect to the applicable criteria, identified in Step 3, above. If the levels of the applicable parameters in each source area are below the applicable FDEP Soil Cleanup Target Levels for Residential Exposure or Groundwater Leachability, (whichever is lower), then no additional assessment activities or source removal activities will be recommended for the four source areas.

Alternative B - The results of the soil investigation for each source area will be evaluated with respect to the applicable criteria, identified in Step 3, above. If the levels of the applicable parameters any of the source areas exceed any of the applicable FDEP Soil Cleanup Target Levels for Residential Exposure or Groundwater Leachability, (whichever is lower), then additional assessment activities or source removal activities may be recommended for applicable source area.

#### Groundwater Investigation, Four Source Areas

Alternative C - The results of the groundwater laboratory results for each source area will be evaluated with respect to the applicable criteria, identified in Step 3, above. If the levels of the applicable parameters in each source area do not exceed the applicable FDEP Groundwater Cleanup Target Levels, then a conclusion indicating that a specific source area has not adversely impacted groundwater will be provided, and that the re-development project can proceed.

Alternative D - The results of the groundwater laboratory results for each source area will be evaluated with respect to the applicable criteria, identified in Step 3, above. If the levels of the applicable parameters in each source area exceed the applicable FDEP Groundwater Cleanup Target Levels, then a conclusion indicating that a specific source area has adversely impacted groundwater will be provided, and that re-development project should be evaluated with respect to additional site assessment activities.

#### Step 6 - Specifying Limits on Decision Errors

Because of the limitations of environmental sampling and analysis, the project must be evaluated with respect to the possibility of making the wrong decision because of incomplete information. The following items are provided:

- 1. Limitations of Decisions Regarding Soil Assessment Activities:
- a. The purpose of the soil sampling activities is to evaluate four source areas for the presence of soil contamination. Since the purpose of this project is to identify the presence of applicable contaminants at each source area, the results will be evaluated with respect to type of contamination, and the vertical extent for the interval from the surface to 28 feet below land surface. If contamination is detected, the horizontal extent will be estimated, and the full horizontal extent will be delineated in the next phase of this project. The number of laboratory samples included in this phase of the project are limited by the budget allocated by Renew Ocala for this project.

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b. With respect to the soil samples obtained, the possibility for errors exist if contaminants are not detected in the sampling intervals or locations. Since split-spoon soil samples will be collected in five-foot intervals, contaminants may be present in an interval not sampled.

- 2. Limitations of Decisions Regarding Groundwater Assessment Activities:
- a. The purpose of the groundwater sampling activities is to determine if groundwater has been impacted by four source areas. Since the purpose of this project is to identify the presence of applicable contaminants at each source area, the results will be evaluated with respect to type of contamination, and will be limited to obtaining groundwater samples from the upper surface of the water table, which is expected to occur at approximately 30 feet below land surface. The proposed temporary monitoring wells will be installed to a depth of 38 feet. The interval below 38 feet will not be investigated as part of this phase of the project.
- b. The purpose of the groundwater sampling phase of this project is to evaluate the four source areas for the presence of parameters above the applicable cleanup target levels, which are designed to represent the highest concentrations at each area. If contamination is detected, the horizontal extent will be estimated based upon the number and locations of the monitoring wells sampled as part of this study. However, if groundwater contamination is detected at any of the four source areas, the full horizontal extent delineation is not part of this project. The number of monitoring wells installed and groundwater samples collected in this phase of the project are limited by the budget allocated by Renew Ocala for this project.

#### Step 7 - Optimizing the Design

The proposed soil and groundwater sampling activities under this Brownfield Phase II ESA have been designed to obtain results regarding the presence of constituents in the soil and groundwater associated with four sources of contamination. The results will be utilized to determine if any interim remedial actions are necessary, or if the groundwater has been adversely impacted. The sampling plan for this project has been based on a specific not to exceed budget, as specified and authorized by Renew Ocala.

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#### **II. PROJECT MANAGEMENT**

TITLE:

**QAPP** 

SITE NAME:

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REVISION DATE:

**SEPTEMBER 28, 2004** 

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#### **FORM B**

#### PROJECT ORGANIZATION AND RESPONSIBILITY

Andreyev Engineering, Inc. James J. Jarmolowski, P.G. Project Manager

- Project Task Assignment
- Data Review & Oversight of field activities
- Technical Report Preparation
- DQO Objectives and Evalutation
- Site Health & Safety Officer

#### Andreyev Engineering, Inc. Quality Assurance Officer Raymond C. Billings

- Review of field sampling procedures
- Review of calibration of field sampling equipment
- Review of field quality control requirements
- Data Validation

#### PC&B Environmental Laboratories

Oviedo, Florida

- NELAP approved Quality
   Assurance Plan
- FDOH# E83239
- Laboratory Analyses for Groundwater, EPA methods 601, 602, 8310 and Total Lead and FLPRO
- Data verification and validation

#### Andreyev Engineering, Inc.

Sanford, Florida Field Sampling Activities Miguel Rodriguez, Senior Environmental Technician

- Soil sampling
- Water Level Measurements
- Well purging and field parameter measurement
- Groundwater sampling

Ace Drilling, Inc.
Deland, Florida
Drilling Activities
Florida Licensed Water Well
Contractor #7114

- Soil borings
- Installation of temporary monitoring wells

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#### **FORM C**

#### **PROBLEM DEFINITION**

This form is utilized to identify the project objectives, provide site information and characteristics, and state the specific problem that the data collection project is designed to solve.

- 1. Site Location: The subject site contains .76 acres of vacant land, with an address of 817 North Pine Avenue, Ocala, Marion County, Florida. The subject site is located immediately to the east of North Pine Avenue (which is also U.S. Highway 441) and is located in Section 7, Township 15 South, Range 22 East, as shown on the U.S. Geological Survey (USGS), "Ocala West", Florida Quadrangle Map, included as **Figure 1**.
- 2. Specific Problem: The subject site previously contained three 10,000-gallon gasoline USTs and one 275-gallon kerosene UST. The three 10,000-gallon USTs were located in the northern portion of the site and the 275-gallon UST was located adjacent to the west of the former building on-site. The subject site also contained two former pump islands. Two petroleum discharges were reported to the FDEP on January 30, 1989, and November 4, 1991. The subject site also utilized a car wash, which was located in the east side of the building.
- 3. Purpose of Brownfield Phase II ESA: The purpose of the Phase II ESA will be to obtain soil and groundwater samples to determine the presence of solvents and petroleum constituents in the soil and groundwater. The potential sources of soil and groundwater contamination include the former car wash building, two former two UST areas, and two former pump islands.

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#### FORM D

#### **PROJECT DESCRIPTION**

This form is utilized to provide a detailed description of the work to be performed, including identification of the designated laboratory, applicable field analytical methods, applicable work schedule and required reports.

- 1. Depth to Groundwater: Based on review of the USGS topographic map, AEI believes that the upper surface of the groundwater table is approximately 30 feet below land surface.
- 2. Direction of Groundwater Flow: Based on topography, AEI believes that the direction of flow is to the southeast. This will be further determined as a result of the Phase II ESA.
- 3. Groundwater Flow Determination: To determine the approximate direction of groundwater flow in the upper surficial aquifer beneath the site, the top-of-casing levels of the six monitoring wells to be installed during the Phase II ESA activities will be surveyed. Water levels will be measured, and the measured elevations will be referenced to an arbitrary benchmark of 100.00 feet established at the site. The depth to groundwater will be measured from the top-of-casing to the nearest hundredth of a foot in each of the wells with a water level indicator. Groundwater depths from top-of-casing were then converted to relative elevations. The use of this procedure is an accepted technical method of determining the water levels on-site. Due to budget limitations, a licensed surveyor will not be utilized to determine levels referenced to National Geodetic Vertical Datum (NGVD).
- 4. Designated Laboratory: The designated laboratory for the Phase II ESA is PC&B Environmental Laboratories, located in Oviedo, Florida. PC&B Environmental Laboratories, Inc. is certified by the Florida DOH (Lab #E83239), and operates under a NELAP approved Quality Assurance Plan. Copies of the NELAP certification information for PC&B are included in **Appendix F**.
- 5. Soil Investigation: The purpose of the soil investigation will be to determine the presence of petroleum constituents in the soil unsaturated zone associated with the former USTs and pump islands, and former car wash. In addition, the soil will be investigated beneath the former car wash area for the presence of solvents. The soil investigation will include installation of six soil borings to obtain OVA readings and obtaining four soil samples for laboratory analyses, which are described as follows:
  - 5a. Soil Vapor Sampling Activities: In order to investigate the petroleum contamination in the soil in the vicinity of the former USTs and pump islands, five soil borings will be installed to 30 feet below land surface. One soil boring will be installed in the former Car Wash area. The proposed locations of the six soil borings are shown on **Figure 2**. Split spoon samples will be collected continuously for the first 15 feet and in 5-foot intervals to 30 feet to determine the presence of organic vapors, which are indicative solvent and petroleum contamination. Headspace organic vapor concentrations will be measured with a calibrated Foxboro 128 Organic Vapor Analyzer.

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#### FORM D (Continued)

#### PROJECT DESCRIPTION

This form is utilized to provide a detailed description of the work to be performed, including identification of the designated laboratory, applicable field analytical methods, applicable work schedule and required reports.

5b. Soil Sampling and Laboratory Analyses: A total of four soil samples will be collected from specific locations for laboratory analyses, which are shown on Figure 2. To investigate the former USTs and pump islands, three soil samples will be collected. The specific depths will be based on a review of the OVA results. Three samples will be analyzed for EPA Method 8021 parameters (volatile organic aromatics). One sample will be analyzed for EPA Method 8100 parameters, and Total Petroleum Hydrocarbons (TPH). To investigate the former car wash area, one soil sample will be collected analyzed for EPA Method 8021 (volatile organic halogens) parameters for solvents. The depth of the soil sample will also be based upon review of the OVA results.

- 6. Monitoring Well Installation: In order to investigate the groundwater beneath the former USTs, pump islands and former car wash area, six permanent wells will be installed under AEI supervision to a depth of 40 feet. The monitoring wells will be installed by Ace Drilling of Deland Florida, Certified Well Contractor #7114 in accordance with requirements specified in Chapter 40C-3, FAC. All drilling equipment, and well installation materials will be decontaminated prior to installation of each monitoring well. The monitoring wells are proposed to be installed at the same locations as the soil borings. The monitoring wells will consist of 15 feet of 0.01-inch well screen which will be connected to 25 feet of 2-inch diameter PVC casing. The wells will be completed with flush mount covers and concrete pads. The filter pack around the well screen will consist of 20/30 silica sand, and will be placed in the annular space two feet above the top of the well screen. A one-foot seal of 30/65 fine sand will be placed above the filter pack. Neat cement grout will be place in the remaining annular space to the land surface. Each well will be completed with a 2 ft by 2 ft concrete pad and a flush mount cover. If any drill cuttings are identified to contain petroleum or solvent constituents, they will be containerized, sampled, and disposed of off-site.
- 7. Well Purging and Field Measurement Procedures: After installation of the six monitoring wells, the sampling activities will be conducted no sooner than 24 hours after installation of the monitoring wells, to allow the water levels to stabilize. Prior to sampling, each monitoring well will be purged by removing at least three well volumes. Field parameters, including pH, conductivity, dissolved oxygen, turbidity and temperature will be recorded at various intervals during the purging of the wells. Samples will be collected only after at least three well volumes were purged and field parameters had stabilized. This methodology is designed to obtain groundwater samples which are representative of aquifer conditions. Appendix G contains a copy of the groundwater field log which will be completed for each monitoring well which will be sampled as part of this Phase II ESA.

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#### FORM D (Continued)

#### PROJECT DESCRIPTION

This form is utilized to provide a detailed description of the work to be performed, including identification of the designated laboratory, applicable field analytical methods, applicable work schedule and required reports.

8. Groundwater Sampling and Laboratory Analyses: The groundwater sampling parameters will consist of the following:

EPA Method 601 (solvent) parameters: All six monitoring wells will be sampled and analyzed for EPA Method 601 parameters.

EPA Method 602 (gasoline) parameters: All six monitoring wells will be sampled and analyzed for EPA Method 602 parameters.

EPA Method 8310 parameters: The monitoring well in the area of the former kerosene UST will be sampled and analyzed for EPA Method 8310 (diesel/kerosene parameters).

Total Lead: All six monitoring wells will be sampled and analyzed for the presence of total lead (EPA Method 6010).

TPH: The monitoring well in the area of the former kerosene UST will also be sampled and analyzed for TPH via the FL PRO Method.

QA Samples: One equipment blank will be obtained and analyzed for EPA Methods 601, 602, 8310, TPH (FL PRO) and total lead. One duplicate sample will be obtained and analyzed for EPA Methods 601, 602, 8310, TPH, and total lead.

- 9. Project Schedule: Upon initiation, the field activities are expected to take four days to complete.
- 10. Report Preparation: Upon completion of all field activities, a comprehensive report will prepared, which will summarize the various assessment procedures, methodologies utilized, soil and groundwater sampling results, and a comparison the results with FDEP target levels as specified in Chapter 62-777, FAC for soil and groundwater. Based on the current schedule, the Brownfield Phase II ESA will be submitted by October 15, 2004.

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#### III. MEASUREMENT DATA ACQUISITION

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#### **FORM E**

#### **SAMPLING DESIGN**

This form is utilized to discuss the sampling design and rationale for the choice of sampling locations for each parameter/matrix.

1. Soil Samples Collected for Laboratory Analyses: As indicated above in Form D, three soil samples, SS-1 through SS-3, will be collected for laboratory analyses to determine the presence of petroleum constituents in the soil in the former UST areas and pump islands. SS-4 will be collected from the area beneath the former car wash building to determine the presence of solvents in the soil. The locations of SS-1 through SS-4 are shown on **Figure 2.** The following items apply for each soil sample to be collected for laboratory analyses:

SS-1:

This soil sample will be collected from the former gasoline UST pit after review of the OVA results from the spilt spoon sampling and OVA evaluation, which will be used to determine the applicable depth. This soil sample will be analyzed for EPA Method 8021(volatile organic aromatics) parameters by PC&B Environmental Laboratories.

SS-2:

This soil sample will be collected from beneath the former pump islands after review of the OVA results from the spilt spoon sampling and OVA evaluation, which will be used to determine the applicable depth. This soil sample will be analyzed for EPA Method 8021(volatile organic aromatics) parameters by PC&B Environmental Laboratories.

SS-3:

This soil sample will be collected from the former 275-gallon kerosene UST pit after review of the OVA results from the spilt spoon sampling and OVA evaluation, which will be used to determine the applicable depth. This soil sample will be analyzed for EPA Method 8021 parameters (volatile organic aromatic parameters), EPA Method 8100 parameters, and Total Petroleum Hydrocarbons (TPH) by PC&B Environmental Laboratories.

SS-4:

This soil sample will be collected from beneath former car wash building after review of the OVA results from the spilt spoon sampling and OVA evaluation, which will be used to determine the applicable depth. This soil sample will be analyzed for EPA Method 8021 parameters (volatile organic aromatics and halogens parameters) by PC&B Environmental Laboratories.

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#### FORM E (Continued)

#### **SAMPLING DESIGN**

This form is utilized to discuss the sampling design and rationale for the choice of sampling locations for each parameter/matrix.

2. Groundwater Samples Collected for Laboratory Analyses: As indicated above in Form D, six groundwater samples will be collected for laboratory analyses to further determine the presence and levels of solvents and petroleum constituents present in groundwater beneath the subject site. The sampling locations are designated as MW-1 through MW-6, and are on Figure 2. The following items apply for each soil sample to be collected for laboratory analyses:

MW-1:

This groundwater sample will be collected from a monitoring well installed in the former gasoline UST pit and will be analyzed for EPA Methods 601 and 602 parameters, and total lead, by PC&B Environmental Laboratories.

MW-2:

This groundwater sample will be collected from a monitoring well installed in the former gasoline UST pit and will be analyzed for EPA Methods 601 and 602 parameters, and total lead, by PC&B Environmental Laboratories.

MW-3:

This groundwater sample will be collected from a monitoring well installed near a former pump island and will be analyzed for EPA Methods 601 and 602 parameters, and total lead, by PC&B Environmental Laboratories.

MW-4:

This groundwater sample will be collected from a monitoring well installed near a former pump island and will be analyzed for EPA Methods 601 and 602 parameters, and total lead, by PC&B Environmental Laboratories.

MW-5:

This groundwater sample will be collected from a monitoring well installed in the area of the former kerosene UST and will be analyzed for EPA Methods 601, 602, 8310, TPH, and total lead, by PC&B Environmental Laboratories.

MW-6:

This groundwater sample will be collected from a monitoring well installed in the area of the former car wash and analyzed for EPA Methods 601 and 602 parameters, and total lead, by PC&B Environmental Laboratories.

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## FORM F-1

## Method and SOP Reference Table

This form is utilized to contain SOP Reference Tables. The appropriate number/letter reference from this table are used to complete Forms F-2 through J and Form L. The referenced Project Analytical and Sampling SOPs have been attached to the QAPP.

Analytical Method Reference:	Project Analytical SOPs:
Include document title, method name/number, revision number, date	Include document title, method name/number, revision number, date
1a. EPA Method 601, EPA -600/4-79-020, Methods for Chemical Analysis of Water & Wastes, Revised March 1983.	<ol> <li>PC&amp;B Environmental Laboratories, NELAP Approved Quality Assurance Plan.</li> </ol>
2a. EPA Method 602, EPA -600/4-79-020, Methods for Chemical Analysis of Water & Wastes, Revised March 1983.	
3a. EPA Method 8021 (Halogens), Test Methods for Evaluating Solid Waste (EPA-SW-846, revised January 1995).	
4a. EPA Method 8021 (Aromatics), Test Methods for Evaluating Solid Waste (EPA-SW-846, revised January 1995).	
5a. EPA Method 8310, Test Methods for Evaluating Solid Waste (EPA-SW-846, revised January 1995).	
6a. EPA Method 6010, Methods for Chemical Analysis of Water & Wastes, Revised March 1983.	
7a. FL PRO, FDEP analytical method for total petroleum hydrocarbons.	

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#### FORM F-1 (Continued)

#### **Method and SOP Reference Table**

#### **Project Sampling SOPs:**

- 1c. FA1000, Regulatory Scope, FDEP SOPs for Field Activities, DEP-SOP-001/01, February 2004.
- 2c. FC 1000, Cleaning Procedures, FDEP SOPs for Field Activities, DEP-SOP-001/01, February 2004.
- 3c. FD 1000, Documentation Procedures, FDEP SOPs for Field Activities, DEP-SOP-001/01, February 2004.
- 4c. FQ 1000, Field Quality Control Requirements, FDEP SOPs for Field Activities, DEP-SOP-001/01, February 2004.
- 5c. FS 2200, Groundwater Sampling, FDEP SOPs for Field Activities, DEP-SOP-001/01, February 2004.
- 6c. FS 3000, Soil Sampling, FDEP SOPs for Field Activities, DEP-SOP-001/01, February 2004.
- 7c. FT 1100, Field Measurement fo Hydrogen Ion Activity (pH), FDEP SOPs for Field Activities, DEP-SOP-001/01, Feb. 2004.
- 8c. FT 1200, Field Measurement of Specific Conductance, FDEP SOPs for Field Activities, DEP-SOP-001/01, February 2004.
- 9c. FT 1400, Field Measurement of Temperature, FDEP SOPs for Field Activities, DEP-SOP-001/01, February 2004.
- 10c. FT 1500, Field Measurement of Dissolved Oxygen, FDEP SOPs for Field Activities, DEP-SOP-001/01, February 2004.
- 11c. FT 1600, Field Measurement of Turbidity, FDEP SOPs for Field Activities, DEP-SOP-001/01, February 2004.
- 12c. FT 1000, General Field Testing and Measurement

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## **FORM F-2**

# Sampling and Analytical Methods Requirements

Parameter	Matrix	Number of Samples (including Field QC)	Analytical Method	Sampling SOP	Containers Per Sample	Preservation Requirements	Maximum, Holding Time at Lab
Volatile Organic Halocarbons	Water	2	EPA 601	5c.	2x 40mL glass VOA Vials	pH to <2 HCL	14 Days
Volatile Organic Aromatics	Water	7	EPA 602	5c.	2x 40mL glass VOA Vials	pH to <2 HCL	14 Days
Volatile Organic Halocarbons	Soil	4-	EPA 8021	90.	1 4ounce clear glass jar	None	14 Days
Volatile Organic Aromatics	Soil	က	EPA 8021	90.	1 4ounce clear glass jar	None	14 Days
Poly Aromatic Hydrocarbons	Water	2	EPA 8310	5c.	1 x 1 Liter Amber Glass	None	7 Days
Poly Aromatic Hydrocarbons	Soil	1	EPA 8100	6c.	1 4ounce clear glass jar	None	7 Days
Total Petroleum Hydrocarbons by FLPRO	Water	2	FL PRO	5c.	1 x 1 Liter Amber Glass	pH to <2	7 Days
Metals by Ion Coupled Plasma Emission Spectrophotometer	Water	2	EPA 6010	5c.	1x125mL HDPD	pH to <2 HNo3	6 Months
Total Petroleum Hydrocarbons by FLPRO	Soil	-	FL PRO	6c.	1 4ounce clear glass jar	None	7 Days

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#### **FORM G**

#### **Preventive Maintenance - Field Equipment**

Identification of the equipment and/or systems requiring periodic preventive maintenance. References are cited regarding how periodic preventive and corrective maintenance of measurement or test equipment is performed to ensure availability and satisfactory performance of the systems. This includes applicable descriptions of how to resolve deficiencies and when reinspections are conducted. This includes the availability of spare parts identified in the manufacturer's operating instructions and how SOPs will be maintained.

Instrument	Activity	Frequency	SOP Ref. No.
Horiba U-10 Water Quality Meter	Calibration, per SOP FT 1000, Appendix I-12	Prior to each use.	7c., 8c., 9c., 10c., 11c., 12c.
Foxboro 128 Organic Vapor Analyzer	Calibration by Cyclone Instruments, a technical instrument rental company, located offsite.	Prior to each use.	12c., & Manufacturer's instructions and specifications.

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### **FORM H**

# Calibration and Corrective Action - Field Equipment

This includes identification of all tools, gauges, instruments, and other equipment used for data collection activities that must be calibrated to maintain performance within specified limits. The calibration procedures are referenced using certified equipment and standards with known relationships to recognized performance standards. The procedures for maintenance of calibration records are referenced.

		T
SOP Ref. No.	7c., 8c., 9c., 10c., 11c., 12c.	12c., 8 Manufacturer's instructions and
Corrective Action	Re-calibration when needed.	Re-calibration when needed.
Acceptance Criteria	See below.	Manufacturer's specifications
Frequency	Prior to each use.	Prior to each use.
Activity	Calibration	Calibration
Instrument	Horiba U-10 Water Quality Meter	Foxboro 128 Organic Vapor Analyzer

# QC REQUIREMENTS FOR STABILIZED FIELD MEASUREMENTS

SOP Ref. No.	5c. (FS 2200)	5 (ES 2200)	JC. (1 3 2200)	5c. (FS 2200)	(00=0:):::	5c. (FS 2200)	(: 0.150)	5c. (FS 2200)
Requirement	±0.2 standard units	±5% of reading		<20% saturation at temperature		<20 NTU		±0.2 degrees C
Field Parameters	Hd	Conductivity		Dissolved Oxygen	-	l urbidity		Temperature

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#### FORM I

#### **Preventive Maintenance - Laboratory Equipment**

Identification of the equipment and/or systems requiring periodic preventive maintenance. References are cited regarding how periodic preventive and corrective maintenance of measurement or test equipment is performed to ensure availability and satisfactory performance of the systems. This includes applicable descriptions of how to resolve deficiencies and when reinspections are conducted. This includes the availability of spare parts identified in the manufacturer's operating instructions and how SOPs will be maintained.

Instrument	Activity	Frequency	SOP Ref No.
Gas Chromatograph/Mass Spectrometer	Follow manufacturer's methodology/requirements	Daily	1,2,3,4a
	Replace injector septum	Weekly	1,2,3,4a
	Change inlet liner	Weekly	1,2,3,4a
	Clean source	Weekly	1,2,3,4a
	Oil turbomecular pump wick	Every 6 months	1,2,3,4a
	Renew rough pump oil	Every 6 months	1,2,3,4a
High Performance Liquid Chromatograph	De-gas and filer all solvents prior to use	Daily	5a
	Clean out waste bottle	Daily	5a
	Follow manufacturer's methodology/requirements	Daily	5a
	Follow manufacturer's monthly instructions	Monthly	5a
	Clean instrument housing	Monthly	5a
7-10-1-1-1-1-1-1-1-1-1-1-1-1-1-1-1-1-1-1	Oil pump heads	Quarterly	5a
	Reseat controller and cables	Quarterly	5a
Gas Chromatograph	Follow manufacturer's methodology/requirements	Daily	6a
	Wipe check ECD	Every 6 months	6a
	Recharge flow controllers	Every 6 months	6a
	Clean injectors glass liners	Every 6 months	6a
lon coupled Plasma Emission Spectrophotometer	Follow manufacturer's methodology/requirements	Daily	7a
	Follow methodology requirements	Bi-weekly	7a

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### **FORM J**

# Calibration and Corrective Action - Laboratory equipment

This includes identification of all tools, gauges, instruments, and other equipment used for data collection activities that must be calibrated to maintain performance within specified limits. The calibration procedures are referenced using certified equipment and standards with known relationships to recognized performance standards. The procedures for maintenance of calibration records are referenced.

Instrument	Activity	Frequency	Acceptance Criteria	Corrective Action	SOP Ref.
Gas Chromatograph/ Mass Spectrometer	Per methodology	Per methodology	Per NELAC & FDEP SOPs	Per NELAC & FDEP SOPs	1,2,3,4a
High Dorformage 1 is in					
Chromatograph	Per methodology	Per methodology	Per NELAC & FDEP SOPs	Per NELAC & FDEP SOPs	5a
Gas Chromatograph	Per methodology	Per methodology	Per NELAC & FDEP SOPs	Per NELAC & FDEP SOPs	ба
Emission	Per methodology	Dor mothodala	Per NELAC & FDFP		
Spectrophotometer	(Section of the section of the secti	Lei illeillodology	SOPs	Per NELAC & FDEP SOPs	7a

Site Name:

**QAPP** 

Site Location

Former Shell Car Wash Ocala, Marion County, Florida **Revision Number: 1.0** 

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#### **FORM K**

#### **Sample Handling and Custody Requirements**

This includes a description of the procedures for sampling handling and custody. Include chain-of-custody forms; identify the sampling tags and custody seals the field teams should use. Refer to the SOPs for collecting, transferring, storing, analyzing, and disposing of samples.

The following SOPs apply:

SOP 3c. FD 1000, Documentation Procedures.

SOP 5c. FS 2200, Groundwater Sampling.

SOP 6c. FS 3000, Soil Sampling.

These are contained in Appendix I.

PC&B's standard operating procedures for sample handling, custody, transferring, storing, analyzing, and disposal of samples complies with NELAC's Quality Assurance Manuals, in effect as of the date of this SOP. Laboratory SOP's are accessible to all personnel to ensure strict compliance with applicable SOP's.

**QAPP** 

Site Name: **Site Location** 

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Ocala, Marion County, Florida

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### FORM L

### **Analytical Precision and Accuracy**

This includes identification of the analytical methods and equipment required, including subsampling or extraction methods, laboratory decontamination procedures and materials, waste disposal requirements (if any) and specific performance requirements for each method.

Analyte	Analytical Method*	Detection Limit (water/soil) (units	Quantitation Limit (water/soil) (units	Precision (water/soil)	Accuracy (water/soil)
1a.	1a.	Per method and PC&B NELAP SOP. See Appendix H, Table 1 for water.	Per method and PC&B NELAP SOP. See Appendix H, Table 1 for water.	Per method and PC&B NELAP SOP. See Appendix H, Table 1 for water.	Per method and PC&E NELAP SOP. See Appendix H, Table 1 fo water.
2a.	2a.	Per method and PC&B NELAP SOP. See Appendix H, Table 2 for water.	Per method and PC&B NELAP SOP. See Appendix H, Table 2 for water.	Per method and PC&B NELAP SOP. See Appendix H, Table 2 for water.	Per method and PC&E NELAP SOP. See Appendix H, Table 2 for water.
За.	3а.	Per method and PC&B NELAP SOP. See Appendix H, Table 3.	Per method and PC&B NELAP SOP. See Appendix H, Table 3.	Per method and PC&B NELAP SOP. See Appendix H, Table 3.	Per method and PC&E NELAP SOP. See Appendix H, Table 3.
4a.	4a.	Per method and PC&B NELAP SOP. See Appendix H, Table 3.	Per method and PC&B NELAP SOP. See Appendix H, Table 3.	Per method and PC&B NELAP SOP. See Appendix H, Table 3.	Per method and PC&B NELAP SOP. See Appendix H, Table 3.
5a.	5a.	Per method and PC&B NELAP SOP. See Appendix H, Table 7.	Per method and PC&B NELAP SOP. See Appendix H, Table 7.	Per method and PC&B NELAP SOP. See Appendix H, Table 7.	Per method and PC&B NELAP SOP. See Appendix H, Table 7.
6a	6а	Per method and PC&B NELAP SOP.	Per method and PC&B NELAP SOP.	Per method and PC&B NELAP SOP.	Per method and PC&B NELAP SOP.
7a	7a	Per method and PC&B NELAP SOP. See Appendix H, Table s 4 & 5.	Per method and PC&B NELAP SOP. See Appendix H, Table s 4 & 5.	Per method and PC&B NELAP SOP. See Appendix H, Table s 4 & 5.	Per method and PC&B NELAP SOP. See Appendix H, Table s 4 & 5.

<sup>\*</sup> Insert the appropriate reference number /letter from Form F-1, Method and SOP Reference Table.

Site Name: Title:

QAPP

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**FORM M** 

## Field Quality Control Requirements

The procedures and requirements contained in EPA Requirements for Quality Assurance Project Plans, October 1997. EPA QA/R-5 (Draft Final), or latest revision, should be followed and referenced.

QC Sample	Frequency *	Acceptance Criteria	Corrective Action
Duplicate	5% per parameter mathxor 1 per project.	Within 20 % of the relative percent difference.	If the duplicate value exceeds 20% of the relative percent difference for a parameter, the sampling procedures will be reviewed, and the laboratory will be contacted for a data quality review. Depending on the results of review of sampling and laboratory procedures, re-sampling may be required.
Equipment Blank	5% per parameter matrix on per project.	Non-detection of applicable method parameters.	If a parameter is detected, the sampling procedures will be reviewed, and the laboratory will be contacted for a data quality review. Depending on the results of review of sampling and laboratory procedures, re-sampling may be required.
VOA Trip Blank	1 per Cooler	Non-detection of parameters of interest.	If a parameter is detected, the sampling procedures will be reviewed, and the laboratory will be contacted for a data quality review. Depending on the results of review of sampling and laboratory procedures, re-sampling may be required.
Cooler Temperature Blank	1 per Cooler	4 degrees C, ±2°	Review procedures. Re-sampling may be required.
Bottle Blank	1 per Lot #	NA for this project	AN

<sup>\*</sup> Circle criterial listed or indicate alternative criteria.

Title: Site Name: Site Location

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## **FORM M**

# Laboratory Quality Control Requirements

QC Sample	Frequency *	Acceptance Criteria	Corrective Action
VOA Reagent/Method Blank	Daily or every 12 hours	As per methodology	As per methodology
Reagent/Method Blank	Daily or every 20 samples	As per methodology	As per methodology
Duplicate	5% per parameter matrix or every 20 samples	As per methodology	As per methodology
Matrix Spike	5% per parameter matrix or every 20 samples	As per methodology	As per methodology
Performance Evaluation (PE) Sample	5% per parameter matrix per concentration level or 2 per program per year.	As per methodology	As per methodology

<sup>\*</sup> Circle criterial listed or indicate alternative criteria.

Site Name:

**QAPP** 

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### FORM N

### **Data Management and Documentation**

This section includes a discussion of data documentation and management from field collection and laboratory analysis to date storage and use. Analytical data packages should include all relevant documents. This section also includes a description of procedures for detecting and correcting errors during data reporting and data entry. Copies of applicable forms or checklists including field calibration forms and chain-of-custody forms are references, and attached, as applicable.

The following SOPs apply:

SOP 3c. FD 1000, Documentation Procedures.

SOP 5c. FS 2200, Groundwater Sampling.

SOP 6c. FS 3000, Soil Sampling.

SOP 12c. FT 1000 General Field Testing and Measurement.

Copies of the chain-of-custody form to be used, the groundwater sampling log and the field calibration form to be used are included in **Appendix G.** The laboratory reports provided by PC&B include all applicable quality assurance documentation in accordance with the NELAC SOPs. These items include:

- a) Data Results Sheets (including any performance evaluation sample results)
- b) Method Blank Results
- c) Surrogate Recoveries and Acceptance Limits
- d) Matrix Spike/Matrix Spike Duplicate Results and Acceptance Limits
- e) Spike/Duplicate and Acceptance Limits
- f) Laboratory Control Sample Results and Acceptance Limits

PC&B's standard operating procedures for sample handling, custody, transferring, storing, analyzing, and disposal of samples complies with NELAC's Quality Assurance Manuals, in effect as of the date of this SOP. Laboratory SOP's are accessible to all personnel to ensure strict compliance with applicable SOP's.

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### IV. ASSESSMENT/OVERSIGHT

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### **FORM O**

### **Assessment and Response Actions**

This section includes a description of the procedures for identifying and correcting any problems encountered during specific project operations.

- 1. Field Sampling Activities: All field sampling activities will be conducted under the supervision of the AEI Project Manager, or a designated representative. The AEI Project Manager will be notified immediately of any problems encountered by the AEI field sampling technician with regard to sampling equipment, sampling procedures, or other related problems. All applicable SOPs for field sampling will be followed by AEI sampling personnel.
- 2. Laboratory Analysis: Laboratory data documentation, management, Quality Control, and all administrative actions of the laboratory, follow NELAC Quality Manuals in effect as of the date of this SOP. Laboratory SOP's are located in the facility with access to all personnel for review at anytime, to ensure strict compliance with applicable SOP's.
- 3. On-Site or Off-Site Assessments: For this project, the sampling activities will be supervised by the AEI Project Manager, James Jarmolowski. Mr. Jarmolowski has over 20 years of environmental consulting experience. Due to the specific budget for this project authorized by Renew Ocala, no offsite assessments or audits will be conducted during the course of this project. AEI believes that the utilization of the procedures contained in this document will result in analytical results which will be utilized in the DQO evaluation of the subject site, as specified in Section 1e.

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### FORM P

### **Project Reports**

This section includes a discussion of the frequency, content, and distribution of project reports that detail project status, results of internal assessment, corrective actions implemented, and project results.

- 1. Laboratory and Field Documentation: The AEI Project Manager and the AEI QA Officer will review the field sampling documentation and the completed laboratory results to insure the laboratory results provided by the laboratory meet the project requirements. The laboratory will be notified of any corrective actions required. As indicated in other sections of this document, the procedures concerning the documentation for the field and laboratory are specified in **Appendix I-3**, FD 1000, Documentation Procedures. FD 1000 contains applicable information with respect to
- 2. Brownfield Phase II ESA Report: Upon receipt of the laboratory analytical results, AEI will prepare a Brownfield Phase II ESA report. The report will be detailed and comprehensive, and will include the results of the DQO evaluation for the soil and groundwater for each of the four source areas. All copies of the reports will be provided to Mr. George Roberts, of Renew Ocala. No other copies will be distributed by AEI to any other parties. Mr. Roberts will be responsible for distribution of the reports to any additional parties.

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### V. DATA VALIDATION AND USEABILITY

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### FORM Q - 1

### **Verification of Sampling Procedures**

This section includes a discussion of the process to be used to review the sampling procedures to verify that they conform to requirements in the sampling and analysis plan.

The AEI Project Manager and the AEI QA Officer will review the field sampling documentation and the completed laboratory results to insure the laboratory results provided by the laboratory meet the project requirements. The validation procedures outlined in the various SOPs will be those used for this project.

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### FORM Q - 2

### **Data Verification and Validation**

This section includes a discussion of the process to be used to verify conformance of the analytical data with predefined requirements. This section also includes a discussion of the process used to validate conformance of the analytical data to the predefined needs of the Brownfields site assessment.

All samples and QC samples are verified and validated by according to NELAC standards and method requirements whichever has stricter requirements.

The AEI Project Manager and the AEI QA Officer will review the field sampling documentation and the completed laboratory results to insure the laboratory results provided by the laboratory meet the project requirements as part of the DQO process. The laboratory will be notified of any corrective actions required.

Due to utilization of a specific budget for this project, no outside third parties will be utilized for data validation.

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### **FORM R**

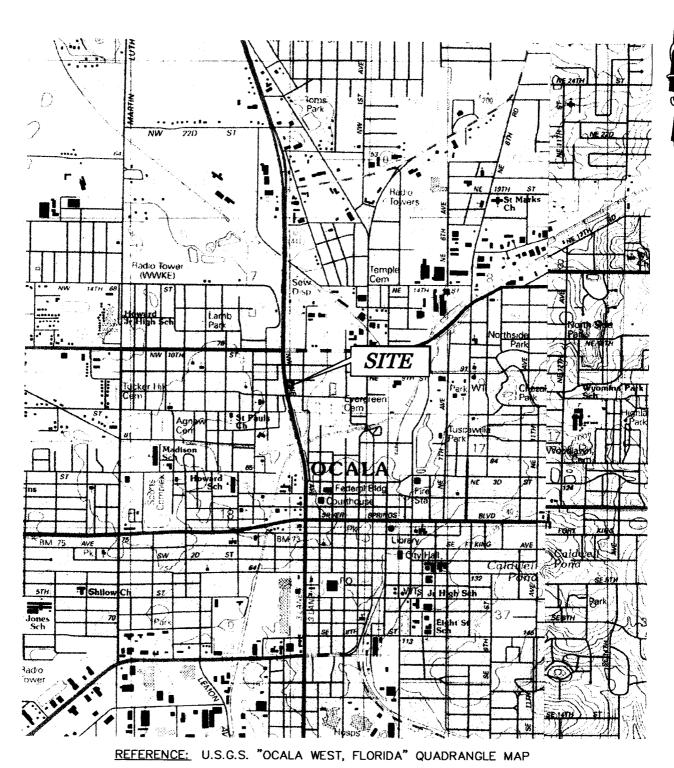
### **Data Useability**

This section includes a discussion of the process for determining whether the data successfully meet the requirements for their intended use, including an outline of the methods to be used to identify anomalies and departures from assumptions in the sampling and analysis design. In addition, this includes how limitations of the data will be reported.

Final usability of data is determined by AEI. All samples and QC samples are verified and validated by PC& B Environmental Laboratories according to NELAC standards and method requirements whichever has stricter requirements.

The data will be evaluated with respect to the DQO objectives, and any anomalies and departures from the assumptions in the sampling and analysis design will be documented in the Brownfield Phase II ESA report. Any limitations of the data generated for this project will be reported in the Brownfield Phase II ESA.

### **FIGURES**



SECTION: 7

TOWNSHIP: 15 SOUTH RANGE: 22 EAST ISSUED: 1991



APPROXIMATE SCALE:

1"=2000'

DATE: 8/19/04

PN:EPEN-04-0080 DRAWN BY: TA

ENGINEER: JJ

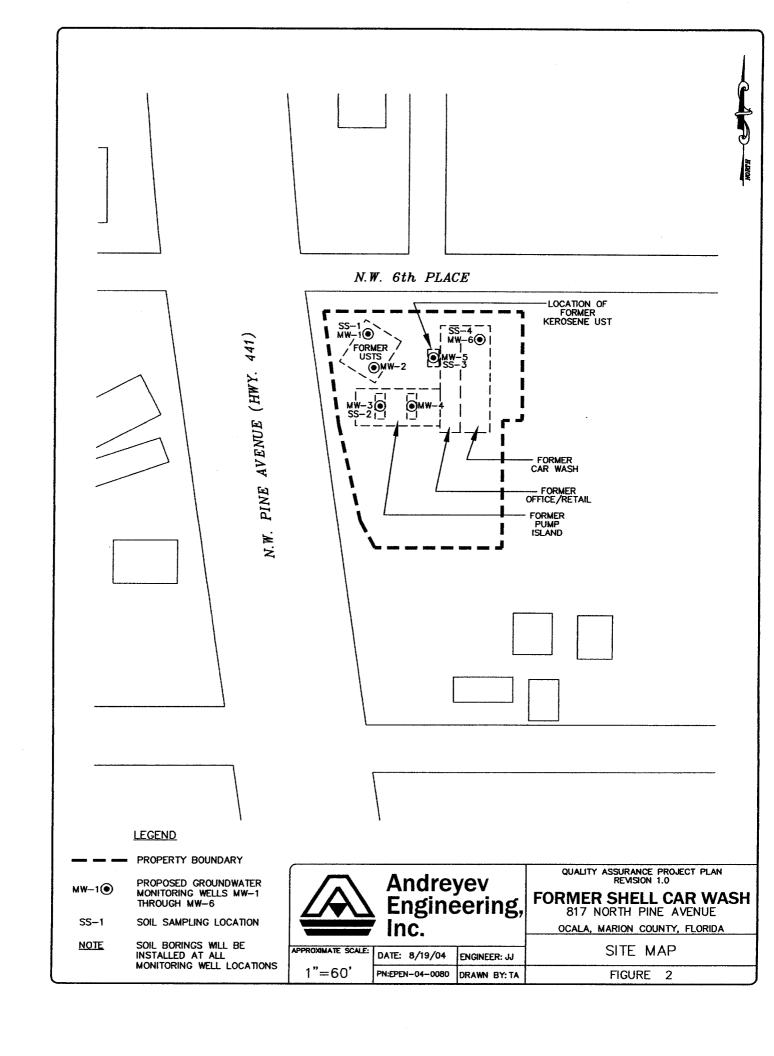
QUALITY ASSURANCE PROJECT PLAN REVISION 1.0

### FORMER SHELL CAR WASH 817 NORTH PINE AVENUE

OCALA, MARION COUNTY, FLORIDA

U.S.G.S. TOPOGRAPHIC MAP

FIGURE 1



### **APPENDICES**

### BROWNFIELDS ASSESSMENT. OCALA, FLORIDA FOIA 2019-003937

BRIEF DESCRIPTION	
Former Shell Cu Wash,	
9/28/04	
TABA	
	Former Shell Cu Wash 9/28/04  TAS A

### APPENDIX A CHAPTER 62-160, FAC

### **CHAPTER 62-160 QUALITY ASSURANCE**

PART I	GENERAL
62-160.100	Purpose. (Repealed)
62-160.110	Purpose, Scope and Applicability.
62-160.120	Definitions.
PART II	FIELD PROCEDURES
62-160.200	Introduction and General Requirements. (Repealed)
62-160.210	Approved Field Procedures.
62-160.220	Approval of New and Alternative Field Procedures.
62-160.230	Research Quality Assurance Plans. (Repealed)
62-160.240	Record Keeping and Reporting Requirements for Field Procedures.
PART III	LABORATORY CERTIFICATION AND PROCEDURES
62-160.300	Laboratory Certification.
62-160.310	Direct Contracts with the Department. (Repealed)
62-160.320	Approved Laboratory Methods.
62-160.330	Approval of New and Alternative Laboratory Methods.
62-160.340	Record Keeping and Reporting Requirements for Laboratory Procedures.
PART IV	MISCELLANEOUS
62-160.400	Sample Preservation and Holding Times.
62-160.410	Quality Control Requirements (Field). (Repealed)
62-160.420	Required Containers, Preservation and Holding Times. (Repealed)
62-160.430	Approval of Alternate Field Procedures. (Repealed)
62-160.500	Approved Analytical Methods. (Repealed)
62-160.510	Quality Control Requirements (Laboratory). (Repealed)
62-160.520	New Methods, Validation Requirements. (Repealed)
62-160.530	Approval of Alternate Test Procedures. (Repealed)
62-160.600	Research Field and Laboratory Procedures.
62-160.610	Field Sampling and Sample Custody Records. (Repealed)
62-160.620	Laboratory Sample Preparation, Analysis and Custody Records. (Repealed)
62-160.630	Quality Control Data and Charts. (Repealed)
62-160.640	Quality Assurance Reports: Guidance and Frequency. (Repealed)
62-160.650	Field and Laboratory Audits.
62-160.660	Project Audits – Data Validation by the Department. (Repealed)
62-160.670	Data Validation by the Department.
62-160.680	Administrative Procedures. (Repealed)
62-160.700	Tables.
62-160.800	Documents Incorporated by Reference.
62-160.900	Forms.

### PART I GENERAL

### 62-160.110 Purpose, Scope and Applicability.

- (1) The purpose of this chapter is to assure that chemical, physical, biological, microbiological and toxicological data used by the Department are appropriate and reliable, and are collected and analyzed by scientifically sound procedures. To this end, this chapter defines the minimum field and laboratory quality assurance, methodological and reporting requirements of the Department.
- (2) Except as provided in subsection (3) of this section, this chapter shall apply to all programs, projects, studies or other activities that are required by the Department, and that involve the measurement, use or submission of environmental data or reports to the Department.
- (3) Programs, projects, studies or activities pertaining to air quality, meteorology, atmospheric radiation, atmospheric noise, electric and magnetic fields or air pollutant emissions, and having no requirements for monitoring contamination of soil or ambient water, are excluded from the scope of this chapter. These excluded activities include those specified in Chapters 62-204, 62-210, 62-212, 62-213, 62-214, 62-252, 62-296 and 62-297 (Air Resources Management), F.A.C.
- (4) The provisions of this chapter shall take precedence over quality assurance requirements in any other Department rule except as otherwise specifically provided for elsewhere in this chapter. However, nothing in this subsection shall be construed to prevent additional or more stringent requirements imposed by any specific contract, order, permit, or Title 62 rule.
- (5) All local and state programs or other organizations with delegated responsibility for Department activities shall assure that the Quality Assurance requirements of this chapter are met for the specified activities.

- (6) If specifically required by the United States Environmental Protection Agency (EPA) for activities conducted for or funded by EPA, Quality Assurance Project Plans (QAPPs) shall be prepared in accordance with "EPA Requirements for Quality Assurance Project Plans, EPA QA/R-5", (EPA/240B-01/003 March 2001), which is incorporated by reference in Rule 62-160.800, F.A.C. These QAPPs will be reviewed and approved by the appropriate EPA office or delegated authority.
- (7) This chapter supports the Quality Assurance Management Plan required by the EPA for any environmental programs funded in part or in whole by the EPA, as specified in EPA Order 5360.1 A2, dated May 5, 2000, which is incorporated by reference in Rule 62-160.800, F.A.C.
- (8) All requirements specified in this chapter shall take effect on the date that this chapter is effective. Quality assurance requirements in Department contracts, orders or permits issued or entered into prior to the effective date of this chapter shall remain in effect until such contracts, orders or permits are modified or renewed.

Specific Authority 403.061, 403.0623 FS. Law Implemented 373.026, 373.309, 373.409, 373.413, 373.414, 373.416, 373.4592, 376.303, 376.305, 376.3071, 403.0623, 403.0625, 403.087, 403.088, 403.0881, 403.504, 403.704, 403.707, 403.722, 403.783, 403.853 FS. History-New 1-1-91, Amended 2-4-93, 2-27-94, Formerly 17-160.110, Amended 3-24-96, 4-9-02, 6-8-04.

### 62-160.120 Definitions and Standards.

For purposes of this chapter:

- (1) "Alternative method" is a field procedure or analytical laboratory method that involves the collection or testing of environmental samples for an analyte (chemical compound, component, microorganism, etc.) in a specified matrix where a Department-approved method already exists. An alternative method is one intended to be used in place of an existing Department-approved laboratory method or field procedure.
- (2) "Audit" is a systematic review of laboratory and field protocols to determine if proper procedures are being used and supporting documentation is present. An audit shall consist of an on-site assessment of sample collection, field sampling procedures, laboratory procedures and/or a review, assessment and/or validation of data associated with a Department program activity. If necessary, an audit shall include the submission of performance samples (for example, blind, split and/or performance check samples) to an organization for subsequent use in the evaluation of that organization's technical performance associated with a specific Department project or program activity.
- (3) "Chemical Abstracts Service (CAS) Registry Number" is a unique number assigned to a chemical by the Chemical Abstracts Service Registry. The CAS is a division of the American Chemical Society and is internationally recognized as the producer of the largest and most comprehensive database of chemical information. The CAS Registry Number provides an unambiguous way to identify a chemical substance or molecular structure.
- (4) "Data quality objectives" are a set of qualitative and quantitative requirements that environmental data must achieve to be acceptable for use in a specific program or project.
- (5) "Data validation" is an evaluation of the technical usability of the verified data with respect to the planned objectives or intention of a project.
- (6) "Data verification" is a consistent, systematic process that determines whether the data have been collected in accordance with project specifications with respect to compliance, correctness, consistency and completeness as compared to a method standard or contract specification.
  - (7) "Department" is the Florida Department of Environmental Protection.
- (8) "Department-approved method" is a field procedure or laboratory analytical method specified as acceptable for use in this chapter and in any other Department contract, order, permit or Title 62 rule.
- (9) "Department of Health (DOH) Environmental Laboratory Certification Program (ELCP)" is the state of Florida's environmental laboratory certification program, authorized by Section 381.00591, F.S., and recognized by the National Environmental Laboratory Accreditation Program (NELAP) as an authority with responsibility and accountability for granting accreditation for specified fields of laboratory testing. The standards used by the DOH ELCP are those established by the National Environmental Laboratory Accreditation Conference (NELAC) as specified in Chapter 64E-1, F.A.C.
- (10) "Holding time" is the storage time allowed between sample collection and sample preparation and/or analysis as specified by regulatory requirements or by the field sample collection protocol or laboratory method.
- (11) "Limited-use method" is an analytical laboratory method that is validated for the testing of environmental samples from a particular site, waste stream (e.g., facility location) or sample matrix (e.g., effluent, groundwater or drinking water). A limited-use method is validated by a single laboratory and may only be used by that laboratory.
- (12) "Matrix" is the predominant material in which an analyte of interest is contained. For example, soil, groundwater and drinking water are three environmental matrices.
- (13) "Method-defined analyte" is defined by the U.S. Environmental Protection Agency as an analyte whose result is totally dependent on how the measurement is made. Any changes or modifications in the preparation or determinative techniques of these methods have the potential of changing the result. Examples are: Carbonaceous Biological Oxygen Demand, Oil and Grease and Toxicity Leaching Procedure.

- (14) "Method detection limit (MDL)" is the minimum concentration of an analyte of interest that can be measured and reported with 99% confidence that the analyte concentration is greater than zero. The MDL for an analyte is determined from the preparation and analysis of a sample in a given matrix containing the analyte. MDLs shall be determined following the procedures specified in "New and Alternative Analytical Laboratory Methods", DEP-QA-001/01 (February 1, 2004) which is incorporated by reference in Rule 62-160.800, F.A.C., unless otherwise specified by a mandated test method for which the laboratory is certified or seeking certification.
- (15) "Method modification" is any modification to an approved field procedure or analytical laboratory method that is specifically allowed by the approved field procedure or analytical laboratory method.
- (16) "NELAC Field of Accreditation Matrix" is defined in the Glossary of the 2001 NELAC standards and shall be used to determine matrices under which a laboratory must be certified:
- (a) Drinking Water: any aqueous sample that has been collected from a water source designated by the Department as a potable or potential potable water source.
- (b) Non-potable Water: any aqueous sample excluded from the definition of drinking water matrix. Includes surface water, groundwater, effluents, water treatment chemicals, and toxicity characteristic leaching procedures (TCLP) or other extracts. To be considered as non-potable water, water treatment chemicals must be in an aqueous solution, and TCLP or other extracts must have been received by the laboratory as the extract, otherwise, the original environmental sample shall determine the field of accreditation matrix.
- (c) Solid and Chemical Materials: includes soils, sediments, sludges, products and by-products of an industrial process that results in a matrix not previously defined. For purposes of accreditation, biosolids are considered a solid.
  - (d) Biological Tissue: any sample of a biological origin such as fish tissue, shellfish, or plant material.
- (17) "National Environmental Laboratory Accreditation Conference (NELAC)" is a voluntary organization of state and federal environmental agencies, sponsored by the EPA, and formed to establish and promote mutually acceptable performance standards for the operation of environmental laboratories. These standards cover both analytical testing of environmental samples and the laboratory accreditation process. The goal of NELAC is to foster the generation of environmental laboratory data of known and documented quality through the adoption of national performance standards for environmental laboratories and other entities directly involved in the environmental field measurement and sampling process.
- (18) "National Environmental Laboratory Accreditation Program (NELAP)" is the program that implements the NELAC standards. NELAP is administered by the EPA.
- (19) "NELAP accreditation" is an accreditation status applied to a laboratory's field(s) of testing upon satisfying all requirements for certification as provided in Chapter 64E-1, F.A.C.
- (20) "New method" is a field procedure or analytical laboratory method that involves the collection or testing of samples for an analyte (chemical compound, component, microorganism, etc.) in a specified matrix where a Department-approved method does not exist.
- (21) "Percent relative standard deviation (% RSD)" is a calculated measure of precision from results of replicate sample analyses. It is calculated as specified in DEP-QA-001/01 (February 1, 2004), which is incorporated by reference in Rule 62-160.800, F.A.C.
- (22) "Permit" is any permit or license issued by the Department pursuant to its lawful authority, or by another government agency under delegation of authority from the Department.
- (23) "Practical quantitation limit (PQL)" is the lowest level of measurement that can be reliably achieved during routine laboratory operating conditions within specified limits of precision and accuracy. For Departmental use, if a laboratory fails to report a PQL, the PQL shall be calculated as four times the MDL.
- (24) "Quality assurance" is an integrated system of management activities involving planning, implementation, documentation, assessment, reporting and quality improvement to ensure that a process, product or service meets defined standards of quality.
- (25) "Quality assurance project plan (QAPP)" is a document required by the EPA for certain activities conducted for or funded by the EPA. The plan outlines the quality assurance criteria, as well as all protocols and quality control measures needed to meet the project data quality objectives. These plans are prepared in accordance with "EPA Requirements for Quality Assurance Project Plans, EPA QA/R-5", (EPA/240/B-01/003 March 2001). These QAPPs are reviewed and approved by the appropriate EPA office or delegated authority.
- (26) "Quality control" is the overall system of technical activities that measures the attributes and performance of a process, product or service against defined standards to verify that they meet the established data quality objectives.
- (27) "Rejection" of data means the Department shall not use the data for the program or project for which they were generated. If the data do not comply with the validation criteria specified in subsection 62-160.670(1), F.A.C., they shall be subject to rejection in part or in whole for use by Department programs, as provided in subsections 62-160.670(2) and (3), F.A.C.
- (28) "Relative percent difference (RPD)" is a calculated measure used to compare results from duplicate sample analyses. It is calculated as specified in DEP-QA-001/01 (February 1, 2004), which is incorporated by reference in Rule 62-160.800, F.A.C.
- (29) "Research method" is a field procedure or analytical laboratory method that involves the evaluation or use of a new, innovative technology.

- (30) "Site-specific sampling method" is a field method that is validated for the collection of environmental samples from a particular site, waste stream (e.g., facility location), or sample matrix (e.g., effluent, groundwater or drinking water). A site-specific sampling method is approved for use on a specific site by any field organization that is conducting field activities for that site. The approval of a site-specific sampling method does not apply to a sampling organization that wishes to use the method on other sites or for other projects. The alternate approval process is outlined in FA 2100 and FA 2200 of DEP-SOP-001/01 (February 1, 2004), which is incorporated by reference in Rule 62-160.800, F.A.C.
- (31) "Spike" is an environmental sample that has been fortified with a known chemical of interest, at a known concentration. The purpose of a spike is to determine the method recovery efficiency for the chemical of interest, at the fortified concentration level, in the particular environmental sample of interest.
- (32) "Statewide method" is a field procedure or analytical laboratory method that is validated for the collection or testing of environmental samples from similar sites or waste streams within the state of Florida by multiple field sampling organizations or laboratories, as applicable. The process for the validation of a statewide method is outlined in FA 2100 and FA 2200 of DEP-SOP-001/01 (February 1, 2004), and "New and Alternative Analytical Laboratory Methods", DEP-QA-001/01 (February 1, 2004)" which are incorporated by reference in Rule 62-160.800, F.A.C.
- (33) "Surrogate spikes" are samples fortified at known concentration(s) with a compound(s) having similar chemical characteristics to the compounds of interest, but which are not normally found in environmental samples.

Specific Authority 403.061, 403.0623 FS. Law Implemented 373.026, 373.309, 373.409, 373.413, 373.414, 373.416, 373.4592, 376.303, 376.305, 376.3071, 403.0623, 403.0625, 403.087, 403.088, 403.0881, 403.504, 403.704, 403.707, 403.722, 403.783, 403.853 FS. History-New 1-1-91, Amended 2-4-93, 2-27-94, Formerly 17-160.120, Amended 3-24-96, 4-9-02, 6-8-04.

### PART II FIELD PROCEDURES

### 62-160.210 Approved Field Procedures.

- (1) All field sampling organizations shall follow the applicable collection and quality control protocols and requirements described in DEP-SOP-001/01 (February 1, 2004), which is incorporated by reference in Rule 62-160.800, F.A.C., unless specifically exempted by the rules of a particular Department program.
- (2) Any party that wishes to apply for new or alternative field procedures other than those specified in DEP-SOP-001/01 (February 1, 2004) shall follow the requirements provided in Rule 62-160.220, F.A.C.

Specific Authority 403.061, 403.0623 FS. Law Implemented 373.026, 373.309, 373.409, 373.413, 373.414, 373.416, 373.4592, 376.303, 376.305, 376.3071, 403.0623, 403.0625, 403.087, 403.088, 403.0881, 403.504, 403.704, 403.707, 403.722, 403.783, 403.853 FS. History-New 1-1-91, Amended 2-4-93, 2-27-94, Formerly 17-160.210, Amended 3-24-96, 10-15-96, 4-9-02, 6-8-04.

### 62-160.220 Approval of New and Alternative Field Procedures.

- (1) Any party may apply for use of a field procedure other than those specified in DEP-SOP-001/01 (February 1, 2004). Any field procedure not included in DEP-SOP-001/01 (February 1, 2004) must be approved by the Department prior to use according to the requirements in DEP-SOP-001/01 (February 1, 2004). Field procedures approved for use by a contract, order, or permit before the effective date of this chapter shall remain approved for the duration of the project. The documentation that approved the use of the procedure must be retained for at least five years after the last use of the procedure.
- (2) Field procedures not included in DEP-SOP-001/01 (February 1, 2004) or not specified by Department contracts, orders or permits, fall into one of the following two categories:
- (a) New a field procedure that involves the collection of an analyte (chemical compound, component, microorganism, etc.) in a specified matrix where a Department-approved field procedure does not exist.
- (b) Alternative a field procedure that involves the collection of an analyte (chemical compound, component, microorganism, etc.) in a specified matrix where a Department-approved procedure already exists. An alternative procedure is one intended to be used in place of an existing Department-approved field procedure. Alternative procedures cannot be approved for the following methods in DEP-SOP-001/01 and DEP-SOP-002/01:
  - 1. FS 7410, Rapid Bioassessment (Biorecon) Method;
  - 2. FS 7420, Stream Condition Index (D-Frame Dipnet) Sampling;
  - 3. FS 7460, Lake Condition Index (Lake Composite Sampling); and
  - 4. FT 3000, Aquatic Habitat Assessment.
- (3) A procedure modification to an approved field procedure that is specifically allowed by the approved procedure are not considered alternative or new procedures and do not require approval by the Department prior to use. However, the field sampling organization shall retain all data that demonstrate that the modification produces equivalent results when applied to the relevant sample matrix. These records shall be retained for at least five years after the last use of the modification.
- (4) A new or alternative field procedure shall be evaluated based on its intended use. A new or alternative field procedure falls into one of two use categories:
- (a) Site-Specific Sampling Method the field procedure is validated for a specified project. A site-specific sampling method is approved for the project, and may be used by any organization designated to perform the procedure for the project.

- (b) Statewide-Use Sampling Method the field procedure is collaboratively validated for the collection of environmental samples from similar sites, matrices, waste streams, etc. within the state of Florida by multiple parties.
- (5) Research field collection procedures shall be submitted for review and approval according to the requirements provided in Rule 62-160.600, F.A.C. If a method is initially developed for research purposes but will subsequently be used for compliance or other regulatory activities, the procedure(s) shall be submitted for review and approval according to subsections 62-160.220(1), (2), (4) and (6), F.A.C.
- (6) Complete requests for a new or alternative field procedure shall be approved if the Department determines that the circumstances for the modification are justified, based on technical merit or logistical limitations in the sampling design, and that the requested modification would cause no loss in the ability of the requesting organization to evaluate data quality. In addition, any alternative field procedure must be demonstrated to meet or exceed the data quality objectives of the project.
- (7) Any new or alternative field procedure approved for statewide use shall be incorporated into updates of the Department's field sampling procedures (DEP-SOP-001/01). New or alternative field procedures approved for limited use shall not be incorporated into DEP-SOP-001/01.
- (8) A field procedure approved by the Department shall be removed from approval if new technical, scientific or regulatory information justifies its removal. The Department shall use the best scientific and technical information, methods and data in its possession in making the determination to remove a procedure from approval.
- (a) If the affected procedure has been approved for statewide use and incorporated into the Department's field sampling procedures (DEP-SOP-001/01), the Department shall issue a notice of intent to revise the SOPs to remove the affected procedure. This notice shall include the technical justification for the removal of the procedure and shall be published in the Florida Administrative Weekly and on the Department's Internet site. Any substantially affected party may request an administrative hearing as provided in Chapter 120, F.S., within 21 days of receipt of the notice.
- (b) If the affected procedure has been approved for limited use, the Department shall issue a notice of intent to remove the procedure from approval. This notice shall include the technical justification for the removal of the procedure and shall be addressed to the party (e.g., permittee, consultant, company) initially requesting approval for the field procedure. Any substantially affected party may request an administrative hearing as provided in Chapter 120, F.S., within 21 days of receipt of the notice.

Specific Authority 403.061, 403.0623 FS. Law Implemented 373.026, 373.309, 373.409, 373.413, 373.414, 373.416, 373.4592, 376.303, 376.305, 376.3071, 403.0623, 403.0625, 403.087, 403.088, 403.0881, 403.504, 403.704, 403.707, 403.722, 403.783, 403.853 FS. History-New 1-1-91, Amended 2-4-93, Formerly 17-160.220, Amended 3-24-96, 10-15-96, 4-9-02, 6-8-04.

### 62-160.240 Record Keeping and Reporting Requirements for Field Procedures.

- (1) All record keeping requirements for field sampling organizations are specified in DEP-SOP-001/01 (February 1, 2004). These records shall be kept by the generator of the records for a minimum of five years after the date of project completion or permit cycle unless otherwise specified in a Department contract, order, permit or Title 62 rules.
- (2) If specified by the Department in a contract, order, permit, or other Title 62 rule, the following field sampling information shall be provided to the Department for each site/facility and sampling location, as applicable:
  - (a) Project information including:
  - 1. Project and/or program identification or name;
  - 2. Site and/or facility name, address and phone number;
  - (b) Site and/or facility locational information to include:
  - 1. Latitude measure in degrees-minutes-seconds (seconds may contain up to four decimal places);
  - 2. Longitude measure in degrees-minutes-seconds (seconds may contain up to four decimal places);
  - 3. Datum the horizontal reference for measuring locations on the Earth's surface;
  - 4. Spheroid the ellipsoid used as a model for the surface of the Earth;
  - 5. Geolocational collection information:
  - a. Collection method the method or mechanism used to derive the measurements;
  - b. Collector name name of individual who collected the locational data;
  - c. Collector affiliation collector's agency or entity affiliation;
  - d. Collection date date locational data were collected;
  - e. Relationship of point to feature the type of the feature for which the measurement is being made;
  - f. Coordinate accuracy level the measured, estimated or deduced degree of correctness of the measurement;
- g. Verification information including name of person verifying the measurement, the date and the time when verification was performed;
  - (c) Information about the collected samples:
  - 1. Name(s) and affiliation of individual(s) collecting samples;
  - 2. Sampling method(s) used;
  - 3. Sample description such as sample type, sample matrix, and sample treatments (preservation, filtration, etc.);
  - 4. Client or field identification number for each sample;
  - 5. Date and time of sample collection, including date and time sample collection ended (if collecting a composite sample);

- 6. Sample collection depth;
- 7. Unambiguous identification of all field-generated quality control samples such as field or equipment blanks, replicate samples or split samples;
  - 8. Any additional information from the field documentation records specified in DEP-SOP-001/01 (February 1, 2004)
  - (d) Information about field measurement activities:
  - 1. Method(s) used to make field measurement;
  - 2. Name of field parameter;
  - 3. Result, result units and associated data qualifier code(s); and
  - 4. Any additional information from the field documentation records specified in DEP-SOP-001/01 (February 1, 2004)
  - (e) Information about site conditions:
  - 1. Weather;
  - 2. Flow (including units);
- 3. Any additional information from the field documentation records specified in DEP-SOP-001/001/01 (February 1, 2004); and;
  - (f) Any additional information specified by the Department in contracts, orders, permits or Title 62 rules.
- (3) Field sampling data issued to a client(s) for Department-related work or directly to the Department shall be provided to the Department in an electronic format consistent with requirements for importing into Department databases, as specified by the Department in applicable contracts, orders, permits or Title 62 rules. In addition, certain Department programs specify the submission of paper reports. Field sampling information may be incorporated into laboratory reports specified in Rule 62-160.340, F.A.C. Specific electronic and paper report format requirements shall be as specified by the Department in the applicable contract, order, permit or Title 62 rule.

Specific Authority 403.061, 403.0623 FS. Law Implemented 373.026, 373.309, 373.409, 373.413, 373.414, 373.416, 373.4592, 376.303, 376.305, 376.3071, 403.0623, 403.0625, 403.087, 403.088, 403.0881, 403.504, 403.704, 403.707, 403.722, 403.783, 403.853 FS. History—New 4-9-02, Amended 6-8-04.

### PART III LABORATORY CERTIFICATION AND PROCEDURES

### 62-160.300 Laboratory Certification.

- (1) Except as provided in subsections 62-160.300(2), (3), (4) and (5), F.A.C., or other Title 62 rules, all laboratories generating environmental data for submission to the Department or for use in Department-regulated or Department-sponsored activities shall hold certification from the DOH ELCP. Such certification shall be for all matrix/test method/analyte(s) combinations being measured. The matrix of a sample is defined to be the condition under which the laboratory originally receives the sample, and shall be classified according to the NELAC Field of Accreditation Matrix groups defined by subsection 62-160.120(16), F.A.C.
- (2) To the extent possible, a laboratory must be certified as specified in subsection 62-160.300(1), F.A.C., before reporting results for a given matrix/test method/analyte combination. However, a Department program may allow a laboratory to begin using a method before the certification process is complete if the laboratory wishes to add an analyte to a matrix/test method combination that is already certified; or if the laboratory is certified for a specific matrix/test method/analyte combination and wishes to add the capability of analyzing samples using the same test method/analyte combination in a different matrix.
- (a) The laboratory must have met all the requirements for certification except for the on-site visit by DOH ELCP inspectors. The laboratory must be prepared to provide to the Department copies of the relevant application, applicable performance test sample results and the initial demonstration of capability, and
- (b) The precision, accuracy and method detection limits generated by the laboratory must meet or exceed the project specific data quality objectives.
- (c) The laboratory shall notify the Department of the status of its certification application within 90 days of the on-site visit by DOH ELCP inspectors.
- (3) Laboratory certification by the DOH ELCP is not required for the following test procedures when conducted for the purposes of drinking water compliance:
  - (a) Alkalinity;
  - (b) Bromide;
  - (c) Calcium;
  - (d) Chlorite (only at entrances to distribution systems);
  - (e) Specific conductance;
  - (f) Disinfectant residual (includes residual chlorine);
  - (g) Orthophosphate;
  - (h) pH;
  - (i) Silica;
  - (j) Specific ultraviolet absorbance;
  - (k) Temperature;

- (1) Total organic carbon; or
- (m) Turbidity.

In cases where the Department has a specific field testing method standard operating procedure (e.g., FT 1100 for pH), the laboratory shall follow the Department's procedures. For all other analytes, a laboratory shall only use test methods that are acceptable for drinking water compliance.

- (4) Except for drinking water compliance testing (see subsection 62-160.300(3), F.A.C), laboratories are not required to be certified by the DOH ELCP when conducting the following test procedures:
  - (a) pH;
  - (b) Dissolved oxygen;
  - (c) Specific conductivity;
  - (d) Temperature;
  - (e) Total residual chlorine (including free available chlorine);
  - (f) Transparency or light penetration;
  - (g) Salinity;
  - (h) Oxidation/reduction potential;
  - (i) Turbidity (when performed at the sampling location);
  - (j) Explosive gases (when monitoring for the Lower Explosive Limit);
  - (k) Sulfite (when performed at the sampling location);
  - (1) Sediment oxygen demand; and
- (m) Any other test with a specific holding time of fifteen minutes or less when performed at the sampling location. However, these laboratories shall follow the applicable standard operating procedures in DEP-SOP-001/01 (February 1, 2004) when conducting the analyses specified in paragraphs 62-160.300(4)(a) through (m), F.A.C.
  - (5) Certification is not required for:
  - (a) Any analyses related solely to internal process control;
  - (b) Geochemical parameters conducted at the sampling location for the purposes of evaluating remediation activities;
- (c) Those matrix/method/analyte combinations (such as taxonomic identification) that are not included in the DOH ELCP scope of accreditation;
  - (d) Research-oriented methods as described in Rule 62-160.600, F.A.C.; or
- (e) Methods developed for site-specific, limited-use purpose if such certification is specifically waived by the Department program for which the method will be used.
- (6) Even if certification is not required (see subsections 62-160.300(3), (4) and (5), F.A.C.), laboratory organizations shall follow the relevant Department-approved methods as provided in Rule 62-160.320, F.A.C., as applicable. In addition, the laboratory shall operate a quality assurance program consistent with the quality systems standards of the NELAC specified in Chapter 64E-1, F.A.C.

Specific Authority 403.061, 403.0623 FS. Law Implemented 373.026, 373.309, 373.409, 373.413, 373.414, 373.416, 373.4592, 376.303, 376.305, 376.3071, 403.0623, 403.0625, 403.087, 403.088, 403.0881, 403.504, 403.704, 403.707, 403.722, 403.783, 403.853 FS. History-New 1-1-91, Amended 2-4-93, 2-27-94, Formerly 17-160.300, Amended 3-24-96, 4-9-02, 6-8-04.

### 62-160.320 Approved Laboratory Methods.

- (1) Approved laboratory methods are specified in the Department's program rules, contracts, orders or permits. When methods are specified by a Department program, rule, contract, order or permit, only those methods shall be used. For informational purposes, the Department's Bureau of Laboratories maintains a list of methods and method compendiums that have been recognized by various Departmental programs. However, this list shall not supersede or limit the use of other methods that may be required by contract, order, permit or Title 62 rule. A copy of this list may be obtained from the Florida Department of Environmental Protection, Environmental Assessment Section, 2600 Blair Stone Road, MS 6511, Tallahassee, Florida 32399-2400.
- (2) Laboratories performing taxonomic identification for periphyton or macrobenthic invertebrates shall use DEP-SOP-002/01, Method LQ 7000 which is incorporated by reference in Rule 62-160.800, F.A.C.
- (3) Laboratories calculating the Stream Condition Index (SCI), the Lake Condition Index or making a Biorecon determination shall follow DEP-SOP-002/01, Methods LD 7000 and LT 7000, which are incorporated by reference in Rule 62-160.800, F.A.C.

Specific Authority 403.061, 403.0623 FS. Law Implemented 373.026, 373.309, 373.409, 373.413, 373.414, 373.416, 373.4592, 376.303, 376.305, 376.3071, 403.0623, 403.0625, 403.087, 403.088, 403.0881, 403.504, 403.704, 403.707, 403.722, 403.783, 403.853 FS. History-New 4-9-02.

### 62-160.330 Approval of New and Alternative Laboratory Methods.

(1) Any party may apply for use of a laboratory method other than those specified in the Department's contracts, orders, permits, or Title 62 rules. Laboratory methods that have been approved for use in a contract, order, permit or Title 62 rule before the effective date of this chapter shall remain approved. The documentation that approved the use of the procedure must be retained for at least five years after the last use of the procedure.

- (2) All laboratory methods that support a Department contract, order, permit or Title 62 rule must be approved by the Department prior to use. These methods fall into one of two categories:
- (a) New an analytical laboratory method that tests for an analyte (chemical compound, component, microorganism, etc.) in a specified matrix where a Department-approved method does not exist;
- (b) Alternative an analytical laboratory method that tests for an analyte (chemical compound, component, microorganism, etc.) in a specified matrix where a Department-approved method does exist. An alternative method is one intended to be used in place of an existing Department-approved method. Alternative procedures cannot be approved for:
- 1. Alternatives to methods that the United States Environmental Protection Agency has designated as "method defined analyte"; and
  - 2. The following methods from DEP-SOP-002/01:
  - a. LT 7100, Biorecon Determination;
  - b. LT 7200, Stream Condition Index (SCI) Determination; and
  - c. LT 7300, Lake Condition Index (LCI) Determination.
- (3) A method modification is any modification to an approved analytical laboratory method that is specifically allowed by the approved method. Method modifications are not considered alternative methods and do not require approval by the Department prior to use. However, the laboratory shall retain all data that demonstrate that the modification produces equivalent results to the unmodified method. These records shall be retained for at least five years after the last use of the modification.
- (4) New and alternative methods shall be demonstrated as appropriate for use according to the requirements in New and Alternative Analytical Laboratory Methods, DEP-QA-001/01 (February 1, 2004) unless otherwise specified in a Department contract, order, permit or Title 62 rule. A new or alternative laboratory method shall be evaluated based on its intended use:
- (a) Limited-Use Method the laboratory method is intended only for testing environmental samples from a particular site, waste stream (e.g., facility location) or sample matrix (e.g., effluent, groundwater or drinking water). A limited-use method is validated by a single laboratory and may only be used by that laboratory.
- (b) Statewide-Use Method the laboratory method is intended for testing environmental samples from similar sites or waste streams within the state of Florida by multiple laboratories. For a statewide method, the Department requires an interlaboratory collaborative study following the specifications in Appendix D of the Official Methods of Analysis of the Association of Official Analytical Chemists (1995), incorporated by reference in Rule 62-160.800, F.A.C. Alternatively, an interlaboratory collaborative study that is designed based on procedures published by a nationally recognized consensus-based standards organization (e.g., American Society for Testing and Materials) may be used. Specifications for these studies are provided in DEP-QA-001/01 (February 1, 2004), incorporated by reference in Rule 62-160.800, F.A.C.
- (5) Research methods shall be submitted for review and approval according to the requirements provided in Rule 62-160.600, F.A.C. If a method is initially developed for research purposes but will subsequently be used for compliance or other regulatory activities, the method shall be submitted for review and approval according to subsections 62-160.330(1), (2) and (4), F.A.C.
- (6) Applicants who are analyzing discharges regulated under the National Pollutant Discharge Elimination System (NPDES) permit system shall comply with applicable provisions of the United States Environmental Protection Agency regulations in 40 CFR Part 136 paragraphs 136.4 and 136.5 (2000). Applicants shall submit the application to the Department, which shall forward the application to the United States Environmental Protection Agency Administrator of Region 4 for review and approval. The determination for approval or rejection shall be made by the United States Environmental Protection Agency.
- (7) Applicants who are analyzing compliance samples under the Safe Drinking Water Act shall comply with the applicable provisions of the United States Environmental Protection Agency regulations (40 CFR Part 141 paragraph 127) and Department Rule 62-550.550, F.A.C. Use of an alternative analytical technique requires written permission from the Department and United States Environmental Protection Agency.

Specific Authority 403.061, 403.0623 FS. Law Implemented 373.026, 373.309, 373.409, 373.413, 373.414, 373.416, 373.4592, 376.303, 376.305, 376.3071, 403.0623, 403.0625, 403.087, 403.088, 403.0881, 403.504, 403.704, 403.707, 403.722, 403.783, 403.853 FS. History-New 4-9-02, Amended 6-8-04.

### 62-160.340 Record Keeping and Reporting Requirements for Laboratory Procedures.

- (1) Laboratory record keeping requirements shall follow those specified by the DOH ELCP Chapter 64E-1, F.A.C. Records shall be retained for a minimum of five years after the date of project completion or permit cycle unless otherwise specified in a Department contract, order, permit or Title 62 rules.
- (2) A laboratory shall issue an analytical report that is consistent with the requirements of the DOH ELCP and using applicable qualifiers as defined in Table 1: Data Qualifiers Codes. In addition, when specified by the Department in a contract, order, permit or other Title 62 rule, the following laboratory information shall be provided in reports issued to the client for Department-related work or in reports issued directly to the Department:
  - (a) Laboratory name, address and phone number;
  - (b) Project information such as client name, site name, client project number, or client project name;
  - (c) Client or field identification number for each sample;
  - (d) Date and time of sample collection;

- (e) Sample matrix (e.g., groundwater, effluent, waste, soil, etc.);
- (f) Sample type (e.g., environmental sample, field blank, matrix spike);
- (g) Laboratory identification number for each sample fraction;
- (h) Sample receipt conditions such as proper and intact custody seals, or receipt temperature;
- (i) Type of chemical and/or physical sample preservative and if intact at sample receipt/analysis;
- (j) Sample analysis method;
- (k) Sample preparation method, if applicable;
- (l) Date of sample preparation, if applicable;
- (m) Time of sample preparation if the holding time specified in Rule 62-160.400, F.A.C., is less than or equal to 48 hours;
- (n) Date of sample analysis;
- (o) Time of sample analysis if the holding time specified in Rule 62-160.400, F.A.C., is less than or equal to 48 hours;
- (p) Identification of all laboratories providing analytical results in the report and the appropriate laboratory certification numbers from the DOH ELCP (if applicable) for each laboratory;
- (q) Textual comments, if applicable, that specify any samples failing to meet preservation, container or holding time as determined by laboratory at sample receipt;
- (r) Textual comments, if applicable, that specify any deviations (such as failed quality control), additions to, or exclusions from, the analytical method (such as environmental conditions), and any non-standard conditions that may have affected the quality of results;
- (s) Batch identifiers that unambiguously link groups of samples to a specified set of activities such as preparation, analysis, shipping, reporting, or quality control;
  - (t) For chemical testing:
  - 1. Analyte name;
  - 2. Analyte CAS registry number or NELAP parameter code, if available;
  - 3. The analytical result for each analysis with applicable Data Qualifiers, as specified in Table 1: Data Qualifiers Codes;
  - a. Non-detected analytes shall be indicated by the method detection limit value, followed by the code "U";
- b. Laboratories may report a non-detected analyte whose method detection limit is two orders of magnitude below the target criterion with a value no greater than one order of magnitude below the target criteria. Such values shall be reported with a "U" qualifier.
  - 4. Result units;
  - 5. Sample lab filtered? (Yes or No was the sample filtered in the laboratory?);
  - 6. Method detection limit(s);
  - 7. Practical quantitation limit(s);
  - 8. Dilution factor;
  - 9. Batch ID (unambiguous reference linking samples prepared or analyzed together);
  - 10. Replicate sample reference (an unambiguous reference to laboratory replicate samples);
  - 11. Matrix spike concentration level (level of analyte added to a spiked sample);
  - 12. Matrix spike recovery (results for matrix spike/duplicate sample analysis required by methods);
  - 13. Matrix spike duplicate recovery (results for matrix spike/duplicate sample analysis as required by the method);
- 14. Matrix spike precision (results for matrix spike/duplicate sample analysis as required by methods expressed as Relative Percent Difference or % Relative Standard Deviation, as defined in DEP-QA-001/01 (February 1, 2004);
  - 15. Matrix spike recovery limits (in-house recovery limits used by the data generator to control their process);
  - 16. Matrix spike precision limits (in-house recovery limits used by the data generator to control their process);
  - 17. Results for laboratory replicate samples (results for duplicate/replicate sample analysis as required by the method);
- 18. Laboratory blank results (results for any laboratory blank analysis as required by the method and DEP-SOP-001/01 (February 1, 2004);
- 19. Field quality control results including trip blanks, field blanks, equipment blanks, and field replicates as required by DEP-SOP-001/01 (February 1, 2004) or the applicable contract, order, permit or Title 62 rule.
  - 20. Surrogate spike concentration level (level of analyte added to the sample);
  - 21. Surrogate spike recovery (if surrogate spikes are required by the method);
  - 22. Surrogate recovery limits (if surrogates are required by the method);
  - 23. Other sample characteristics such as percent moisture or fraction (i.e., total or dissolved);
  - (u) For toxicity (bioassay) testing:
  - 1. Test type (acute or chronic);
  - 2. Test organism(s) used;
  - 3. Age(s) of test organism(s);
  - 4. Test result(s);
  - 5. Statistical method used to generate the result(s);
  - 6. Control data (mortality/weight/reproduction, etc.) as appropriate to test type;
  - 7. Test end points and confidence intervals;

- 8. Standard reference toxicant data associated with batch of test organisms;
- 9. Physical and chemical measures (pH, temperature, dissolved oxygen, etc.).
- (v) For benthic invertebrate taxonomic identification:
- 1. Sorting efficiency, as percent (%);
- 2. Number and identity of taxa in sample;
- 3. Percent agreement between or among identifications performed by two or more independent taxonomists associated with period when results were generated;
  - 4. Were all organisms verified against standard reference collection? (Yes or No);
  - 5. Does organism range include Florida? (Yes or No).
  - (w) For algal taxonomic identification:
- 1. Percent agreement between or among identifications performed by two or more independent taxonomists associated with period when results were generated;
  - 2. Number and identity of taxa in sample;
  - 3. Microscope magnification;
  - 4. Dilution factor;
  - 5. Surface area sampled (periphyton); volume sampled (phytoplankton);
  - 6. Number of fields counted;
  - 7. Counting chamber dimensions.
  - (x) For microbiological testing:
  - 1. Identity of test:
  - 2. Test result with applicable data qualifiers, as specified in Table 1: Data Qualifiers Codes;
  - 3. Test result units;
- 4. Results for laboratory replicate samples (results for duplicate/replicate sample analysis as required by the method) and field replicate samples, if performed;
  - 5. Replicate sample reference (an unambiguous reference to laboratory replicate samples);
- 6. Field and laboratory blank results (results for any field and laboratory blank analysis as required by the method and DEP-SOP-001/01 (February 1, 2004);
  - 7. Number of colonies in dilution water suitability test associated with samples;
  - 8. Optimal growth in media test? (Yes or No);
  - (y) Any additional elements specified by the Department in contracts, orders, permits or Title 62 rules.
- (3) If requested by the Department in an applicable contract, order, permit or Title 62 rule, laboratory data issued to a client(s) for Department-related work or directly to the Department shall be provided in an electronic format consistent with requirements for importing into Department databases. In addition, certain Department programs specify the submission of paper reports. Specific electronic and paper report format requirements shall be specified by the Department in the applicable contract, order, permit or Title 62 rule.

Specific Authority 403.061, 403.0623 FS. Law Implemented 373.026, 373.309, 373.409, 373.413, 373.414, 373.416, 373.4592, 376.303, 376.305, 376.3071, 403.0623, 403.0625, 403.087, 403.0881, 403.504, 403.704, 403.707, 403.722, 403.783, 403.853 FS. History-New 4-9-02, Amended 6-8-04.

### PART IV MISCELLANEOUS

### 62-160.400 Sample Preservation and Holding Times.

- (1) Except as noted in subsection (2) below, or as otherwise provided for in the rules of a specific Department program, sample preservation methods, container types and holding times shall follow those requirements specified in DEP-SOP-001/01 (February 1, 2004), section FS 1070, which is incorporated by reference in Rule 62-160.800, F.A.C.
- (2) Sample preservation procedures, container material and maximum allowable holding times for analytes not specified in DEP-SOP-001/01 (February 1, 2004) shall follow the method-specified requirements. If no method-specified requirements exist, the best available scientific knowledge shall be used as guidance for determining the appropriate procedures for use.

Specific Authority 403.061, 403.0623 FS. Law Implemented 373.026, 373.309, 373.409, 373.413, 373.414, 373.416, 373.4592, 376.303, 376.305, 376.3071, 403.0623, 403.0625, 403.087, 403.088, 403.0881, 403.504, 403.704, 403.707, 403.722, 403.783, 403.853 FS. History-New 1-1-91, Amended 2-4-93, Formerly 17-160.400, Amended 3-24-96, 10-15-96, 4-9-02, 6-8-04.

### 62-160.600 Research Field and Laboratory Procedures.

- (1) Research field sampling and laboratory procedures involve one or more of the following:
- (a) Evaluation, development or use of new, innovative technologies not yet approved by the Department;
- (b) Evaluation, development or use of innovative field sampling or analytical laboratory methods not yet approved by the Department;
  - (c) Evaluation of new methodology or technology to be used in lieu of a Department-approved method; and

- (d) Other projects not included in the above areas but designated as research by the relevant Department project or contract manager.
- (2) If a research field sampling or laboratory method is being developed for subsequent use in compliance or other regulatory activities, the method shall be reviewed and approved according to the requirements provided in Rules 62-160.220 and 62-160.330, F.A.C.
- (3) All research field sampling and laboratory procedures shall be described in a Department-approved work or study plan or in direct contract language. The following minimum elements shall be addressed, as applicable:
  - (a) Project purpose and intended end use of the data, including specific hypotheses;
  - (b) Brief historical overview or literature searches;
  - (c) Statement of anticipated results or effects of the research project;
- (d) Description of work to be conducted, including the types of analyses to be performed to monitor the effectiveness of the research;
- (e) The information and records to be included in the data report package and the reporting format for hard copy and electronic reports. Minimum requirements for record keeping shall follow those specified in Rules 62-160.240 and 62-160.340, F.A.C., as applicable;
- (f) Identification of any specialized training or certification needed by personnel in order to successfully complete the project or task. This requirement includes specifying any laboratory certification requirements as provided in Rule 62-160.300, F.A.C. The Department project manager may waive the requirement for laboratory certification as provided in paragraph 62-160.300(5)(e), F.A.C. Regardless of this waiver of certification requirement, laboratories conducting work for these projects shall operate a quality assurance program consistent with the quality systems standards of the NELAC specified in Chapter 64E-1, F.A.C.
- (g) All aspects of data generation and acquisition to ensure appropriate methods for sampling, measurement and analysis, data collection or generation, data handling, and quality assurance and quality control activities are employed and documented;
  - (h) The experimental data generation or data collection design for the project, including as appropriate:
  - 1. Types and numbers of samples required;
  - 2. Design of the sampling network;
  - 3. Sampling locations and frequencies;
  - 4. Sample matrices;
  - 5. Analytes of interest;
  - 6. Rationale for the design;
- 7. Procedures for collecting samples, including sample handling, preservation and custody in the field, laboratory and transport, and sampling equipment specifications and equipment decontamination procedures;
  - 8. Sample preparation (if applicable) and analytical methods used;
- 9. Quality control activities needed for sampling and analysis, and the assessment of the quality control results. Quality control activities for the field and the laboratory include, but are not limited to, the use of blanks, duplicates, matrix spikes, laboratory control samples and surrogates;
- 10. Quality assurance activities that occur after the data collection or generation phase of the project, such as data verification validation, and field and laboratory audits;
- 11. Criteria to be used to objectively and consistently review, verify and validate project data, including the chain of custody for data throughout the life of the project or task;
- 12. Proposed methods to analyze the data and determine possible anomalies or departures from assumptions established in the planning phase of data collection; and
  - 13. Any additional elements specifically required by the Department project manager.
- (4) The Department shall conduct a technical review of the project work plan prior to the project's initiation in order to assess its technical and scientific merit and appropriateness.

Specific Authority 403.061, 403.0623 FS. Law Implemented 373.026, 373.309, 373.409, 373.413, 373.414, 373.416, 373.4592, 376.303, 376.305, 376.3071, 403.0623, 403.0625, 403.087, 403.088, 403.0881, 403.504, 403.704, 403.707, 403.722, 403.783, 403.853 FS. History-New 1-1-91, Amended 2-4-93, Formerly 17-160.600, Amended 3-24-96, 10-15-96, 4-9-02.

### 62-160.650 Field and Laboratory Audits.

- (1) The Department and agencies or individuals with delegated authority from the Department shall conduct periodic audits of field and laboratory procedures or records to determine if approved protocols are being followed as required and to ensure data are being generated in compliance with the requirements of this chapter.
  - (2) An audit shall consist of one or more of the following:
  - (a) An on-site assessment of field sampling and/or laboratory procedures;
  - (b) A review, assessment and/or validation of data associated with a Department program activity;
- (c) The submission of performance samples (for example, blind, split and/or performance check samples) to an organization for subsequent use in the evaluation of that organization's technical performance associated with a specific Department project or program activity; or

- (d) Other relevant information as specified in a Department contract, order, permit or Title 62 rule.
- (3) Upon request, the field sampling organization, consultant or responsible party shall provide copies of all applicable records as specified in Rule 62-160.240, F.A.C. Sufficient information shall be provided to enable the auditor to independently reconstruct all field procedures related to the project.
- (4) Upon request, the laboratory, consultant or responsible party shall provide copies of those applicable records as specified in Rule 62-160.340, F.A.C. Sufficient information shall be provided to enable the auditor to independently reconstruct all laboratory procedures related to the project.
- (5) A final audit report will be provided to the audited party within ninety (90) days of the audit unless the Department provides written request for additional information. In that case, the Department shall specify a date by which the audited party will receive the final audit report in the written request for additional information. Upon receipt of the final audit report, the audited party shall have thirty (30) days thereafter to respond to the Department with a letter that addresses the corrective action and implementation schedule for any deficiency that may have been noted in the final report, and provides justification for noted deficiencies that will not be addressed or corrected.
- (6) Failure to respond with a letter of corrective action or to additional requests for corrective action shall result in the rejection by the Department of the associated project data until such time that the noted deficiencies are corrected. Rejection of data under this subsection shall follow the procedures set forth in subsection 62-160.670(3), F.A.C., and Chapter 120, F.S.

Specific Authority 403.061, 403.0623 FS. Law Implemented 373.026, 373.309, 373.409, 373.413, 373.414, 373.416, 373.4592, 376.303, 376.305, 376.3071, 403.0623, 403.0625, 403.087, 403.088, 403.0881, 403.504, 403.704, 403.707, 403.722, 403.783, 403.853 FS. History-New 1-1-91, Formerly 17-160.650, Amended 3-24-96, 4-9-02.

### 62-160.670 Data Validation by the Department.

- (1) All data generated for Department activities are subject to data verification and data validation to determine if the data meet program or project data quality objectives. Data shall be verified and validated based on the assessment of the following:
- (a) Completeness of the Department requested data package(s) and the response of involved parties to any Department requests for additional data;
- (b) Integrity of samples as determined by complete and proper sample chain of custody documentation, and adherence to proper preservation, transport or handling protocols, as applicable;
  - (c) Proper use of sample collection and analysis methodology;
  - (d) Proper and sufficient use of quality control measures and criteria;
  - (e) Documentation of all generated data as provided in Rules 62-160.240 and 62-160.340, F.A.C.;
- (f) Ability to reconstruct all field sampling and laboratory procedures through the documentation and records of the laboratory or field sampling organization as provided in Rules 62-160.240 and 62-160.340, F.A.C.;
  - (g) Ability to trace data in the final report to a specific sampling site, date and time;
- (h) Status of the laboratory's certification through the DOH ELCP as provided in Chapter 64E-1, F.A.C., for any given analyte or category of analytes. Data associated with any given analyte or category of analytes generated during any period of suspension or revocation of laboratory certification as provided in Sections 403.0625(4) and (5) and 403.863, F.S., shall be subject to rejection unless certification requirements have been waived as provided in paragraph 62-160.300(5)(e), F.A.C.; and
- (i) Appropriateness of the collected data as related to the specific data quality objectives of the Department program activity or project for which they were collected.
- (2) If the Department determines that the data cannot be verified or validated based on one or more of the items in paragraphs 62-160.670(1)(a) through (i), F.A.C., or the Department determines that the affected data are not useable for their intended purpose, the data shall be rejected in whole or in relevant part by the Department.
- (3) If the Department determines the data should be rejected, either in whole or in part for use by its programs or for a specified project, the Department shall issue a notice of intent to reject. A copy of the notice of intent to reject shall be provided, as applicable, to the affected permittee, facility owner/operator, laboratory and any field sampling consultant, as well as to any party who has submitted a specific request to receive such notice. Any substantially affected party (e.g., respondent, permittee, consultant, company or laboratory) may request an administrative hearing as provided in Chapter 120, F.S., within 21 days of receipt of the notice.

Specific Authority 403.061, 403.0623 FS. Law Implemented 373.026, 373.309, 373.409, 373.413, 373.414, 373.416, 373.4592, 376.303, 376.305, 376.3071, 403.0623, 403.0625, 403.087, 403.088, 403.0881, 403.504, 403.704, 403.707, 403.722, 403.783, 403.853 FS. History—New 1-1-91, Amended 2-4-93, 2-27-94, Formerly 17-160.670, Amended 3-24-96, 4-9-02.

### 62-160.700 Tables.

The following table have been referenced in this chapter and is identified by this title: Table 1: Data Qualifier Codes.

### Table 1 DATA QUALIFIER CODES

The following codes shall be used by laboratories when reporting data values that either meet the specified description outlined below or do not meet the quality control criteria of the laboratory:

### SYMBOL MEANING

- Value reported is the arithmetic mean (average) of two or more determinations. This code shall be used if the reported value is the average of results for two or more discrete and separate samples. These samples shall have been processed and analyzed independently. Do not use this code if the data are the result of replicate analysis on the same sample aliquot,
- B Results based upon colony counts outside the acceptable range. This code applies to microbiological tests and specifically to membrane filter colony counts. The code is to be used if the colony count is generated from a plate in which the total number of coliform colonies is outside the method indicated ideal range. This code is not to be used if a 100 mL sample has been filtered and the colony count is less than the lower value of the ideal range.
- When reporting species: F indicates the female sex.
- H Value based on field kit determination; results may not be accurate. This code shall be used if a field screening test (i.e., field gas chromatograph data, immunoassay, vendor-supplied field kit, etc.) was used to generate the value and the field kit or method has not been recognized by the Department as equivalent to laboratory methods.
- I The reported value is between the laboratory method detection limit and the laboratory practical quantitation limit.
- J Estimated value. A "J" value shall be accompanied by a narrative justification for its use. Where possible, the organization shall report whether the actual value is less than or greater than the reported value. A "J" value shall not be used as a substitute for K, L, M, T, V, or Y, however, if additional reasons exist for identifying the value as estimate (e.g., matrix spiked failed to meet acceptance criteria), the "J" code may be added to a K, L, M, T, V, or Y. The following are some examples of narrative descriptions that may accompany a "J" code:
  - No known quality control criteria exist for the component;
  - The reported value failed to meet the established quality control criteria for either precision or accuracy (the specific failure must be identified);
  - The sample matrix interfered with the ability to make any accurate determination;
  - The data are questionable because of improper laboratory or field protocols (e.g., composite sample was collected instead of a grab sample).
  - The field calibration verification did not meet calibration acceptance criteria.
- K Off-scale low. Actual value is known to be less than the value given. This code shall be used if:
  - 1. The value is less than the lowest calibration standard and the calibration curve is known to be non-linear; or
  - 2. The value is known to be less than the reported value based on sample size, dilution.
  - This code shall not be used to report values that are less than the laboratory practical quantitation limit or laboratory method
- L Off-scale high. Actual value is known to be greater than value given. To be used when the concentration of the analyte is above the acceptable level for quantitation (exceeds the linear range or highest calibration standard) and the calibration curve is known to exhibit a negative deflection.
- M When reporting chemical analyses: presence of material is verified but not quantified; the actual value is less than the value given. The reported value shall be the laboratory practical quantitation limit. This code shall be used if the level is too low to permit accurate quantification, but the estimated concentration is greater than the method detection limit. If the value is less than the method detection limit use "T" below.
- N Presumptive evidence of presence of material. This qualifier shall be used if:
  - 1. The component has been tentatively identified based on mass spectral library search; or
  - 2. There is an indication that the analyte is present, but quality control requirements for confirmation were not met (i.e., presence of analyte was not confirmed by alternative procedures).
- O Sampled, but analysis lost or not performed.
- Q Sample held beyond the accepted holding time. This code shall be used if the value is derived from a sample that was prepared or analyzed after the approved holding time restrictions for sample preparation or analysis.
- Value reported is less than the laboratory method detection limit. The value is reported for informational purposes only and shall not be used in statistical analysis.
- U Indicates that the compound was analyzed for but not detected. This symbol shall be used to indicate that the specified component was not detected. The value associated with the qualifier shall be the laboratory method detection limit. Unless requested by the client, less than the method detection limit values shall not be reported (see "T" above).

- V Indicates that the analyte was detected in both the sample and the associated method blank. Note: the value in the blank shall not be subtracted from associated samples.
- The laboratory analysis was from an improperly preserved sample. The data may not be accurate.
- Z Too many colonies were present (TNTC); the numeric value represents the filtration volume.
- Data are rejected and should not be used. Some or all of the quality control data for the analyte were outside criteria, and the presence or absence of the analyte cannot be determined from the data.
- Not reported due to interference.

The following codes deal with certain aspects of field activities. The codes shall be used if the laboratory has knowledge of the specific sampling event. The codes shall be added by the organization collecting samples if they apply:

- D Measurement was made in the field (i.e., in situ). This applies to any value (except pH, specific conductance, dissolved oxygen, temperature, total residual chlorine, transparency, or salinity) that was obtained under field conditions using approved analytical methods. If the parameter code specifies a field measurement (e.g., "Field pH"), this code is not required.
- E Indicates that extra samples were taken at composite stations.
- R Significant rain in the past 48 hours. (Significant rain typically involves rain in excess of 1/2 inch within the past 48 hours.) This code shall be used when the rainfall might contribute to a lower than normal value.
- Data deviate from historically established concentration ranges.

Specific Authority 403.061, 403.0623 FS. Law Implemented 373.026, 373.309, 373.409, 373.413, 373.414, 373.416, 373.4592, 376.303, 376.305, 376.3071, 403.0623, 403.0625, 403.087, 403.088, 403.0881, 403.504, 403.704, 403.707, 403.722, 403.783, 403.853 FS. History-New 1-1-91, Amended 2-4-93, 2-27-94, Formerly 17-160.700, Amended 3-24-96, 4-9-02, 6-8-04.

### 62-160.800 Documents Incorporated by Reference.

- (1) Specific references to the documents listed below are made throughout this chapter and are incorporated by reference.
- (a) Department of Environmental Protection Standard Operating Procedures for Field Activities, DEP-SOP-001/01 (February 1, 2004), Florida Department of Environmental Protection, Bureau of Laboratories, Environmental Assessment Section. This document is a compendium of standard operating procedures with the following major topics:
  - 1. FA 1000: Regulatory Scope and Administrative Procedures for Use of FDEP SOPs;
  - 2. FC 1000: Cleaning/Decontamination Procedures;
  - 3. FD 1000: Documentation Procedures;
  - 4. FM 1000: Field Planning and Mobilization;
  - 5. FQ 1000: Field Quality Control Requirements;
  - 6. FS 1000: General Sampling Procedures;
  - 7. FS 2000: General Aqueous Sampling;
  - 8. FS 2100: Surface Water Sampling:
  - 9. FS 2200: Groundwater Sampling;
  - 10. FS 2300: Drinking Water Sampling;
  - 11. FS 2400: Wastewater Sampling;
  - 12. FS 3000: Soil Sampling;
  - 13. FS 4000: Sediment Sampling;
  - 14. FS 5000: Waste Sampling;
  - 15. FS 6000: General Biological Tissue Sampling;
  - 16. FS 7000: General Biological Community Sampling;
  - 17. FS 8100: Contaminated Surface Sampling;
  - 18. FS 8200: Clean Sampling for Ultratrace Metals in Surface Waters;
  - 19. FT 1000: General Field Testing and Measurement; and
  - 20. FT 3000: Aquatic Habitat Characterization;
- (b) Department of Environmental Protection Standard Operating Procedures for Laboratory Activities, DEP-SOP-002/01 (February 1, 2004), Florida Department of Environmental Protection, Bureau of Laboratories, Environmental Assessment Section:
  - 1. LD 1000: Laboratory Documentation;
  - 2. LQ 1000: Laboratory Quality Control; and
  - 3. LT 7000: Determination of Biological Indices.
- (c) New and Alternative Analytical Laboratory Methods, DEP-QA-001/01 (February 1, 2004), Florida Department of Environmental Protection, Bureau of Laboratories, Environmental Assessment Section.

- (d) EPA Requirements for Quality Assurance Project Plans, EPA QA/R-5 (EPA/240/B-01/003, March 2001), United States Environmental Protection Agency.
- (e) Interlaboratory Collaborative Study for Method Validation in the AOAC, Appendix D, Official Methods of Analysis of the Association of Official Analytical Chemists (AOAC), 16th edition (1995), Association of Official Analytical Chemists.
- (f) Closed-System Purge-and-Trap and Extraction for Volatile Organics in Soil and Waste Samples, Method 5035, Test Methods for Evaluating Solid Waste, Physical/Chemical Methods, SW 846, Third Edition, November 1986 as amended by Update III, December 1996; United States Environmental Protection Agency.
- (g) Standard Methods for the Examination of Water and Wastewater, 20th Edition (1999); American Public Health Association, American Water Works Association and Water Environment Federation. The following methods and tables are incorporated by reference:
  - 1. Table 4500-H<sup>+</sup>:I: Preparation of pH Standard Solutions, Method 4500-H<sup>+</sup> B, Electrometric Method;
  - 2. Method 2510, Conductivity;
  - 3. Method 2520, Salinity;
  - 4. Table 8010:III: Procedure for Preparing Reconstituted Seawater, Method 8010, Introduction to Toxicity;
  - 5. Method 4500-O C, Dissolved Oxygen, Azide Modification;
  - 6. Method 2130, Turbidity;
  - 7. Residual Chlorine:
  - a. Method 4500-CI B, Iodometric Method I
  - b. Method 4500-CI C, Iodometric Method ll
  - c. Method 4500-CI D, Amperometric Titration Method
  - d. Method 4500-CI F, DPD Ferrous Titrimetric Method
  - e. Method 4500-CI E, Low-Level Amperometric Titration Method
  - f. Method 4500-CI G, DPD Colorimetric Method
- (h) Methods for Chemical Analysis of Water and Wastes, Revised March 1983, United States Environmental Protection Agency. The following methods and tables are incorporated by reference:
  - 1. Method 120.1, Conductance, Specific,
  - 2. Method 330.1 Chlorine, Total Residual, Titrimetric, Amperometric,
  - 3. Method 330.2 Chlorine, Total Residual, Titrimetric, Back, Iodometric,
  - 4. Method 330.3 Chlorine, Total Residual, Titrimetric, Iodometric,
  - 5. Method 330.4 Chlorine, Total Residual, Titrimetric, DPD-FAS,
  - 6. Method 330.5, Chlorine, Total Residual, Spectrophotometric, DPD.
- (i) Policy and Program Requirements for the Mandatory Agency-Wide Quality System, EPA Order 5360.1 A2, May 5, 2000, United States Environmental Protection Agency.
- (j) U.S. Environmental Protection Agency Office of Research and Development, ICR Microbial Laboratory Manual, EPA/600/R-95/178, Section VII, Part 9, April 1996.
- (k) U.S. Environmental Protection Agency Office of Water, Method 1623: Cryptosporidium and Giardia in Water by Filtration/IMS/FA, EPA-821-R-99-006, April 1999.
- (2) The referenced documents are available for inspection at the Department's district and Tallahassee offices. Some referenced documents are available at the Department's Internet site.

 $Specific \ Authority \ 403.061, \ 403.0623 \ FS. \ Law \ Implemented \ 373.026, \ 373.309, \ 373.409, \ 373.413, \ 373.414, \ 373.416, \ 373.4592, \ 376.303, \ 376.305, \ 376.3071, \ 403.0623, \ 403.0625, \ 403.087, \ 403.088, \ 403.0881, \ 403.504, \ 403.704, \ 403.707, \ 403.722, \ 403.783, \ 403.853 \ FS. \ History-New \ 4-9-02, \ Amended \ 6-8-04.$ 

### 62-160.900 Forms.

At this time, this chapter contains no forms. If forms are added to this chapter in the future, they will be included in this section.

Specific Authority 403.061, 403.0623 FS. Law Implemented 373.026, 373.309, 373.409, 373.413, 373.414, 373.416, 373.4592, 376.303, 376.305, 376.3071, 403.0623, 403.0625, 403.087, 403.088, 403.0881, 403.504, 403.704, 403.707, 403.722, 403.783, 403.853 FS. History-New 1-1-91, Amended 2-4-93, Formerly 17-160.900, Amended 3-24-96, 10-15-96, 4-9-02.

### Table 1 DATA QUALIFIER CODES

The following codes shall be used by laboratories when reporting data values that either meet the specified description outlined below or do not meet the quality control criteria of the laboratory:

SYMBOL	MEANING
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Α	Value reported is the arithmetic mean (average) of two or more determinations. This code shall be used if the reported value is the average of results for two or more discrete and separate samples. These samples shall have been processed and analyzed independently. Do not use this code if the data are the result of replicate analysis on the same sample aliquot, extract or digestate.
В	Results based upon colony counts outside the acceptable range. This code applies to microbiological tests and specifically to membrane filter colony counts. The code is to be used if the colony count is generated from a plate in which the total number of coliform colonies is outside the method indicated ideal range. This code is not to be used if a 100 mL sample has been filtered and the colony count' is less than the lower value of the ideal range.
F	When reporting species: F indicates the female sex.
Н	Value based on field kit determination; results may not be accurate. This code shall be used if a field screening test (i.e., field gas chromatograph data, immunoassay, vendor-supplied field kit, etc.) was used to generate the value and the field kit or method has not been recognized by the Department as equivalent to laboratory methods.
1	The reported value is between the laboratory method detection limit and the laboratory practical quantitation limit.
J	Estimated value. A "J" value shall be accompanied by a narrative justification for its use. Where possible, the organization shall report whether the actual value is less than or greater than the reported value. A "J" value shall not be used as a substitute for K, L, M, T, V, or Y, however, if additional reasons exist for identifying the value as estimate (e.g., matrix spiked failed to meet acceptance criteria), the "J" code may be added to a K, L, M, T, V, or Y. The following are some examples of narrative descriptions that may accompany a "J" code:  No known quality control criteria exist for the component;  The reported value failed to meet the established quality control criteria for either precision or accuracy (the specific failure must be identified);  The sample matrix interfered with the ability to make any accurate determination;  The data are questionable because of improper laboratory or field protocols (e.g., composite sample was collected instead of a grab sample).  The field calibration verification did not meet calibration acceptance criteria

SYMBOL	MEANING
	Off-scale low. Actual value is known to be less than the value given. This
	code shall be used if:
	The value is less than the lowest calibration standard and the calibration
K	curve is known to be non-linear; or
	2. The value is known to be less than the reported value based on sample
	size, dilution.
	This code shall not be used to report values that are less than the laboratory
	practical quantitation limit or laboratory method detection limit.
	Off-scale high. Actual value is known to be greater than value given. To be
•	used when the concentration of the analyte is above the acceptable level for
L	quantitation (exceeds the linear range or highest calibration standard) and
	the calibration curve is known to exhibit a negative deflection.
	·
	When reporting chemical analyses: presence of material is verified but not
	quantified; the actual value is less than the value given. The reported value
М	shall be the laboratory practical quantitation limit. This code shall be used if
	the level is too low to permit accurate quantification, but the estimated
	concentration is greater than the method detection limit. If the value is less than the method detection limit use "T" below.
	that the method detection limit use 1 pelow.
	Presumptive evidence of presence of material. This qualifier shall be used if:
	1. The component has been tentatively identified based on mass spectral
N	library search; or
14	<ol><li>There is an indication that the analyte is present, but quality control</li></ol>
	requirements for confirmation were not met (i.e., presence of analyte was not
	confirmed by alternative procedures).
0	Sampled, but analysis lost or not performed.
Ü	Campica, but analysis lost of not performed.
	Sample held beyond the accepted holding time. This code shall be used if
Q	the value is derived from a sample that was prepared or analyzed after the
	approved holding time restrictions for sample preparation or analysis.
	Value reported is less than the laboratory method detection limit. The value
T	is reported for informational purposes only and shall not be used in statistical
	analysis.
	Indicates that the compound was analyzed for but not detected. This symbol
	shall be used to indicate that the specified component was not detected.
U	The value associated with the qualifier shall be the laboratory method
	detection limit. Unless requested by the client, less than the method
	detection limit values shall not be reported (see "T" above).
	Indicates that the analyte was detected in both the sample and the
V	associated method blank. Note: the value in the blank shall not be
	subtracted from associated samples.
	The laboratory analysis was from an improperly preserved sample. The data
Y	may not be accurate.
	y weekinger

SYMBOL	MEANING
Z	Too many colonies were present (TNTC); the numeric value represents the filtration volume.
?	Data are rejected and should not be used. Some or all of the quality control data for the analyte were outside criteria, and the presence or absence of the analyte cannot be determined from the data.
*	Not reported due to interference.
the laboratory	codes deal with certain aspects of field activities. The codes shall be used if has knowledge of the specific sampling event. The codes shall be added by on collecting samples if they apply:
D	Measurement was made in the field (i.e., in situ). This applies to any value (except pH, specific conductance, dissolved oxygen, temperature, total residual chlorine, transparency, or salinity) that was obtained under field conditions using approved analytical methods. If the parameter code specifies a field measurement (e.g., "Field pH"), this code is not required.
E	Indicates that extra samples were taken at composite stations.
R	Significant rain in the past 48 hours. (Significant rain typically involves rain in excess of ½ inch within the past 48 hours.) This code shall be used when the rainfall might contribute to a lower than normal value.
1	Data deviate from historically established concentration ranges.

### BROWNFIELDS ASSESSMENT. OCALA, FLORIDA FOIA 2019-003937

FOLDER NUMBER	BRIEF DESCRIPTION	<del>                                     </del>
424-157	Former Shell Car Wash 9/28/of	
127 101	9/28/04	
	TAB B	
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## APPENDIX B

# FDEP POLICY MEMORANDUMS REGARDING CHAPTER 62-160, FAC AND BROWNFIELDS ACTIVITIES



# Department of Environmental Protection

Jeb Bush Governor Twin Towers Office Building 2600 Blair Stone Road Tallahassee, Florida 32399-2400

David B. Struhs Secretary

# NOTICE TO PERSONS RESPONSIBLE FOR BROWNFIELDS SITE REHABILIATION AND CONTRACTORS PERFORMING WORK PURSUANT TO SECTION 376.81, F.S.

### **BROWNFIELDS REDEVELOPMENT PROGRAM**

On April 9, 2002, the Department adopted changes to Chapter 62-160, Florida Administrative Code (F.A.C.). This Rule incorporates, by reference, the Department's Standard Operating Procedures (SOP) for Field Activities (DEP-SOP-001/01). The SOP for groundwater Sampling has new procedures that shall be followed <a href="mailto:immediately">immediately</a>. Copies of these documents can be obtained online at:

### http://www.dep.state.fl.us/labs/sop/index.htm

All fieldwork that begins on or after April 9, 2002 shall be conducted in accordance with this Rule. Similar to the Bureau of Petroleum Storage Systems and the Bureau of Waste Cleanup's Hazardous Waste Cleanup Section the following exemption will apply to all work conducted in accordance with the Brownfields Redevelopment Program:

Although the Groundwater Sampling SOP allows for continued purging if the stabilization parameters are not within acceptable limits after purging five well volumes, sampling must be performed after the fifth well volume unless otherwise approved by the respective the Department's Brownfields Coordinator or an approved local pollution control program's Brownfields Coordinator.

The Quality Assurance Section recently sent a letter to all analytical laboratories that currently have a comprehensive quality assurance plan with the Department, stating that the new quality assurance rule and SOPs required all laboratories performing analytical work for Department projects must be National Environmental Laboratory Accreditation Program (NELAP) certified. The later further stated that the laboratories had one year to obtain the certification. All contractors are encouraged to review the Quality Assurance Sections guidelines that may be obtained online at:

http://www.dep.state.fl.us/labs/ga/index.htm#documents

For ready reference in the District Offices, we are including a notebook (along with the paper copy of this memo) that contains all documents that were incorporated by reference into the new rule. A copy has also been placed in the Tallahassee DEP Library. This notebook should be made available to anyone who wishes to review any of the material that was incorporated by reference in the rule.

The new QA Rule more clearly states DEP's expectations for laboratory and field performance. The new Rule also delineates criteria for assessing data acceptability, enabling programs to make decisions concerning data usability and quality, which are based on their program Data Quality Objectives. The new SOPs reflect improvements in technology, cover additional topics, and are better organized than the previous versions. I have asked Dr. Bill Coppenger, Chief of the Bureau of Laboratories, to provide support to DEP programs in several areas related to the QA Rule. Our primary emphasis will be on delivering scientific training (field SOPs and data consumer education), performing audits (laboratory, field, and data review), and providing program-specific scientific and technical support. I encourage you to have staff contact either Bill or Russ Frydenborg, Administrator of the Environmental Assessment Section, to request assistance in these areas.

You may also visit the Bureau of Laboratories' website, <a href="http://www.dep.state.fl.us/labs/qa/index.htm">http://www.dep.state.fl.us/labs/qa/index.htm</a>, for comprehensive information about the QA Rule, a link to DEP field Standard Operating Procedures, and for the complete text of the Rule.

Thank you.

Date:

August 6, 2002

To:

**Division Directors** 

a <sup>-</sup>

Regulatory District Directors

From:

Edwin J. Conklin, Director

Resource Assessment and Management

Subject:

Rule 62-160, Quality Assurance

After three years of effort, with substantial department staff and public involvement, the revised Quality Assurance (QA) Rule (62-160) was adopted on April 9, 2002. The QA Rule, which takes precedence over all other QA provisions in rule, changes the requirements that organizations must meet for environmental data that are submitted to the Department of Environmental Protection (DEP).

#### The new QA Rule:

Eliminates the current system of program-specific requirements and a Department-Approved Comprehensive Quality Assurance Plan (CompQAP).

Requires that the Department of Health (DoH) certify all laboratories that provide data to DEP, with some exceptions, under the National Environmental Laboratory Accreditation Program (NELAP) standards.

❖ Requires that organizations conducting field activities follow DEP Standard Operating Procedures (DEP SOP-001/01) that are incorporated by reference into the rule.

❖ Specifies procedures for submitting new or alternative laboratory or field procedures (or methods) for consideration by the department. Existing alternative methods in contracts, orders, etc. are still valid.

Itemizes the information that must be submitted if requested by a program.

❖ Identifies the circumstances under which the department will audit a laboratory or field organization, including the types of audits.

Establishes the criteria by which DEP will evaluate environmental data to determine its acceptability and appropriateness for use.

Laboratories need to apply to the DoH Environmental Laboratory Certification Program for NELAP Certification by October 9, 2002, and must complete certification no later than October 9, 2003. I am pleased to note that several department District Labs have already submitted applications under the program. Staff from the Bureau of Laboratories have previously provided "NELAP readiness" training to District Labs, and will continue to do so, upon request.

Entities performing field sampling (including your programs) must develop a quality manual (see FA 3300 in the Standard Operating Procedures) by October 9, 2002. This manual does not need to be submitted to the Bureau of Laboratories for pre-approval, but will be evaluated during routine audits.

# BROWNFIELDS ASSESSMENT. OCALA, FLORIDA FOIA 2019-003937

FOLDER NUMBER	BRIEF DESCRIPTION	
424-157	TAB C	

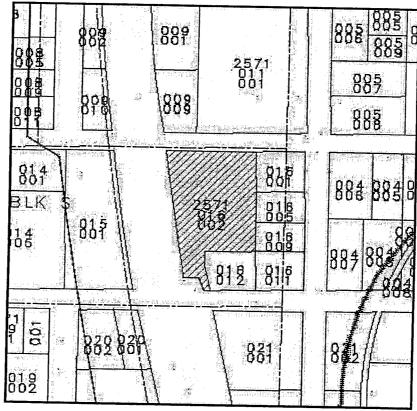
# APPENDIX C MARION COUNTY PROPERTY APPRAISER INFORMATION

# Marion County Property Appraiser

Villie M. Smith, CFA, ASA

Property Focus Map

General Section Map. 178 C4 071522



### Data Summary for Parcel 2571-016-002

Owner Name	CENTRAL FLORIDA LLP
Situs Address	000817 N PINE AVE
Section/Town/Range	7 15 22
Property Acreage	0.76
Current Just Value	117,845
Current Taxes/Assessments	2456.24
Current Millage Id	1001

Parcel Information:

Year: Current

Roll: 1 Parcel ID: 2571-016-002 Alternate

**Key:** 1226228

Parcel Address: **000817 N PINE AVE** 

**Homestead:** 00

**Buildings:** 0

Res Sqft: 0

Roof Sqft: 0

Mill Group: 1001 **Zone Type:** R

MHP Spaces: 0 Acreage: .76

Com Sqft: 0 Misc Sqft: 0

Owner Info:

Name:

CENTRAL FLORIDA LLP

Address: PO BOX 262

HARRIMAN TN

null

**Zip Code:** 344780262

### Legal Description:

SEC 07 TWP 15 RGE 22 PLAT BOOK A PAGE 6 DUNNS NW ADD TO OCALA BLK O LOTS 1.3.5.7.9.& E 10 FT OF BONNER ST BLOCK P LOTS 2.4.6.8.10 & E 10 FT OF BONNER ST ALL LYING E OF US-441 R-O-W

Assessments Return to Menu

Back

# Marion County Property Appraiser

### Villie M. Smith, CFA, ASA

Search. Previous Parcel. Next Parcel.

## 2571-016-002

2571-016-002 Alt Key:1226228	** Property	MARION CO	UNTY ion **	As c	ef 05/30/0
CENTRAL FLORIDA LLP PO BOX 262 HARRIMAN TN	LOCATIO	ASSESSMENT ON: N PINE A	<u>S:</u> \$2 VE	MAP: 178	M.S.T.U. C4 PC: 1 iill Grp 100 .76 Acre
**	Current	Values	**		
Property Values: Land Just Va : Buildings : Miscellaneou		112,800 0 5,045			
: Total Just/A : Total Taxabl	ssd 1	117,845 117,845			
**	History of As	sessed Val	lues **		
Year Land Building	Misc Impr	Just	Assessed 1	Exemption	Taxable
2003 1 112,800 0 2002 1 94,000 0	5,045	117,845	117,845	0	
2001 1 94,000 0	5,045	99,045 99,045	99,045 99,045	0	99,045 99,045
** (Official Records Transfer)	Property Tran	sfer Histo		,	
Book Page Date Instrument	Code		Qualified/ Unqualifie		t/ ved Price
ASKI/NG99 01/99 AK ASKING	9 0		υ		v
2307/1206 10/96 06 WARANT	TY 0		υ		I
2307/1191 10/96 06 WARANT	Y 0		บ		I
2302/1435 10/96 06 WARANT	Y'' 0		υ		I
1400/0301 12/86 46 CORP M	ERG 0		ប		I

### \*\* Property Description \*\*

- 01 SEC 07 TWP 15 RGE 22
- 02 PLAT BOOK A PAGE 6
- 03 DUNNS NW ADD TO OCALA
- 04 BLK O LOTS 1.3.5.7.9.& E 10 FT OF BONNER ST
- 05 BLOCK P LOTS 2.4.6.8.10 & E 10 FT OF BONNER ST
- 06 ALL LYING E OF US-441 R-O-W

### \*\* Land Data

\*\*

LN Use Front	Depth Zone C Notes	Units Type Rate	Doh	Log Che D	hy Just Va
01 1000 200			יינקט.	Hoe sup P	ny Just Va
		200.00 FF 600.00	100	100 94 1	00 112,80
Neighborhood	5057 441-NW 10TH ST TO	N OVERDAGE TOtal Tand	1	G]	
Mkt: 8 70		TOTAL DAIL		Class	112,80
MKL: 8 /0		Total Land	-	Just	770.00
		10cai Banc		oust	112,80

### \*\* Miscellaneous Improvements \*\*

Туре 144		per Units/Type 8760.00 SF	Life 05	EYB 1973	Grade	Lengtl	n Width	Just Valu
159	PAV CONCRETE	2667.00 SF	20	1973	1			3,43 1,61
				Total Just	Value	as of	03/24/98	5,04

### \*\* Appraiser Notes

01 - BLDG WAS DEMOLISHED 07/98

## \*\* Planning and Building \*\* County Permit search

	Permit	Permit	Date	Date	Construction	Description
	Number	Amount	Issued	Complete		
01	OC01592	6,200	09/91	-	GASTNK RMVL	
02	OC01211	9,000	07/98	-	DEMO	

### \*\* Cost/Market Summary \*\*

Bldg - Just Value 0 Misc - Just Value 5,045 03/24/98 Land - Just Value 112,800 05/07/03 Total Just Value 117,845

## BROWNFIELDS ASSESSMENT. OCALA, FLORIDA FOIA 2019-003937

FOLDER NUMBER	BRIEF DESCRIPTION	
424-157	TABD	

# APPENDIX D SITE PHOTOGRAPHS AND AERIAL PHOTOGRAPH

## 1999 AERIAL PHOTOGRAPH



**LEGEND** 

PROPERTY BOUNDARY



APPROXIMATE SCALE:

1"=150'

DATE: 8/19/04 PN:EPEN-04-0080

ENGINEER: JJ

BO DRAWN BY: TA

QUALITY ASSURANCE PROJECT PLAN REVISION 1.0

### FORMER SHELL CAR WASH 817 NORTH PINE AVENUE

OCALA, MARION COUNTY, FLORIDA

1999 AERIAL PHOTOGRAPH

**APPENDIX** 

# SITE PHOTOGRAPHS MARCH 26, 2004

### PHOTOGRAPHIC INDEX

### Former Shell Car Wash 817 North Pine Avenue Ocala, Marion County, Florida

March 26, 2004

- 1.
- 2.
- 3.
- View from northern portion of the subject site, facing south. View from southern portion of the subject site, facing north. View from central portion of the subject site, facing southwest. View from the central portion of the subject site, facing south. 4.









# BROWNFIELDS ASSESSMENT. OCALA, FLORIDA FOIA 2019-003937

FOLDER NUMBER	BRIEF DESCRIPTION	
424-157	TABE	

# APPENDIX E PHASE I ESA & ADDITIONAL SITE INFORMATION

# TEXT FROM HSW PHASE I ESA OCTOBER 28, 2003



# PHASE I ENVIRONMENTAL SITE ASSESSMENT REPORT

SHELL CAR WASH #12 819 N.W. PINE AVENUE OCALA, FLORIDA FDEP FACILITY NO. 428511327

Prepared for:

Renew Ocala Ocala, Florida

October 28, 2003

Prepared by:

HSW Engineering, Inc. 3820 Northdale Blvd., Suite 210B Tampa, Florida 33624 813-968-7722



October 29, 2003

Mr. George Roberts Renew Ocala 405 SE Osceola Ave. Ocala, FL 34470

Re: Phase I Environmental Site Assessment (ESA) Report

Shell Car Wash #12 819 N.W. Pine Avenue Ocala, FL

Dear Mr. Roberts:

Attached are three copies of the Phase I ESA for the referenced site. Based on the findings of the Phase I ESA (presence of recognized environmental conditions), Phase II activities are recommended in order to evaluate the presence or absence of both soil and groundwater impacts from the reported petroleum discharges. HSW will prepare a preliminary scope of work and cost estimate to implement this work. Concerning these discharges, the site owner (or person responsible for performing site rehabilitation activities) may want to investigate whether these discharges are eligible under either (or both) the Florida Petroleum Liability and Restoration Insurance Program (FPLRIP) or the Petroleum Cleanup Participation Program (PCPP). Questions concerning eligibility may be directed to the Eligibility Coordinator with the FDEP (850 245-8853) or we can provide assistance in the matter.

On behalf of HSW Engineering, Inc. we greatly appreciate the opportunity to assist RENEW OCALA with its Brownfield Program.

Sincerely,

HSW Engineering, Inc.

Fred A. Seguiti, P.G. Principal Hydrogeologist

PLG/FAS/pap

Enclosures



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### **EXECUTIVE SUMMARY**

The City of Ocala retained HSW Engineering, Inc. (HSW) to perform a Phase I Environmental Site Assessment (ESA) of the property known as the former Shell Car Wash No. 12 located at 819 NW Pine Avenue. The purpose of this Phase I ESA is to identify, to the extent feasible pursuant to the processes prescribed in American Society of Testing and Materials (ASTM) E-1527-00 Standard Practice for Environmental Site Assessments, recognized environmental conditions in connection with the property.

The property consists of a vacant lot totaling approximately 24,300 square feet. Information evaluated by HSW during the completion of this Phase 1 ESA included, but is not limited to: regional topographic maps, historical aerial photographs, an environmental record search for the subject property and surrounding areas, interviews questionnaire the site owner and Marion County Health, site inspection records, and select additional information that provided historical use information regarding the site. Based upon the information made available to HSW or obtained during the ESA, HSW provides the following conclusions/opinions:

- A discharge of unleaded gasoline was discovered on the subject site on January 30, 1989. No documentation was found describing environmental impacts attributed solely to this release. An additional discharge of kerosene was reported on November 4, 1991. Florida Environmental Compliance Corporation (FECC) reported that this release did not breach the top of the water table and that all of the impacted soils were removed, resulting in a "No Further Action" recommendation.
- Omega Environmental Services discovered excessively contaminated soil (soil registering a reading of greater than 1000 parts per million on an organic vapor analyzer) on the southern edge of the underground storage tank (UST) area. No active cleanup for this release is in progress, due to eligibility changes for petroleum contaminated sites seeking reimbursement for State-funded cleanup with priority scores of less than 50 points; the subject site has a priority score of 10 points. HSW did not identify other recognized environmental conditions apparent at the surface at 819 NW Pine Avenue, Ocala, FL during the site reconnaissance on September 18, 2003;

• Three other sites in the immediate vicinity (Jet-Ocala, U-Haul Center of Ocala, and Circle K #8614) have historical petroleum releases. However, the locations and/or distances of these sites from the subject site are such that it is unlikely that any of these sites have or will impact the subject site.



#### 1.0 INTRODUCTION

The City of Ocala retained HSW to perform this Phase I ESA for the property located at 819 NW Pine Avenue (formerly 817 Bonners Lane) Ocala, Florida. HSW received authorization from the City of Ocala to proceed with the Phase I ESA under Purchase Order No. 57061. Mr. Philip Glover and Mr. Bob Bretnall performed the work, under the management of Mr. Fred Seguiti; resumes are provided in Appendix A. HSW conducted this Phase I ESA to evaluate whether recognized environmental conditions are present at 819 NW Pine Avenue.

In performing this work, HSW used reasonable care and performed the work in accordance with currently accepted practices and standard procedures, including ASTM E-1527-00 Standard Practice for Environmental Site Assessments. Other than this, no warranty is implied or intended. It is understood that an environmental assessment generally cannot, and does not in this case, lead to a full knowledge of site conditions but indicates conditions only for those exact locations and the specific time where observations are made. There can be no assurance, and HSW offers no assurances, that site conditions do not exist or could not exist in the future, that were undetected and could lead to liability in connection with the site. In conducting its investigation, HSW analyzed the records in keeping with existing environmental standards and enforcement practices, but cannot accurately predict what actions any given agency may presently take or what standards and practices may apply to the site in the future.

This assessment has been prepared for the sole use of the City of Ocala and its authorized representatives. Other parties should not rely upon its contents without the express written consent of HSW and the City of Ocala.



#### 2.0 SITE DESCRIPTION

The subject property is located in Section 7, Township 15 South, Range 22 East on the Ocala West U.S. Geological Survey quadrangle (Figure 1). The property consists of an approximately 24,300 square feet vacant lot, identified as Parcel ID No. 2571-016-002 by the Marion County Property Appraiser's office (Appendix B). The property is currently owned by Central Florida, LLP. The property is zoned commercial and is approximately 3/5-acre in total size. The 1991 USGS Ocala West, Florida 7-1/2 minute quadrangle and 1980 aerial photograph were reviewed to characterize current land conditions.

The property is located within a commercially zoned area (Figure 2). Ocala Metal Products is located to the west, across Pine Avenue. Several blocks to the west and south the area becomes residential, whereas the area to the east is zoned commercial or industrial. An HSW representative visited the subject property on September 18, 2003 (see Section 5.0).



## 3.0 USER PROVIDED INFORMATION

A title survey was conducted for this property and no additional information was obtained regarding the existence of environmental liens, easements, use limitations, or other specialized knowledge surrounding the site. Title search information is provided in Appendix C.



### 4.0 RECORDS REVIEW

HSW reviewed the following information in order to ascertain the historical uses of the site and adjacent properties to characterize past site conditions and evaluate previous land uses:

- Marion County Property appraiser's legal description and aerial photographs dated 1949, 1964, 1970, and 1980.
- Polk<sup>TM</sup> City Directory listings
- Marion County Storage Tank Facility Records
- FDEP Oculus Document Management System Records

### 4.1 Aerial Photographs (Appendix D)

1949 Aerial Photograph – The property has what appears to be a residential building. The north is undeveloped; the area to the south and west is residential, and the east and southeast appears be commercial and light industrial, although the parcel *immediately* to the east is largely undeveloped.

1964 Aerial Photograph – Pine Avenue is now evident along its current course. The parcel immediately to the east has what appears to be a large residential building facing west, and the area to the north has undergone some residential development.

1970 Aerial Photograph – These photos are of rather poor quality, but it appears that the area remains largely unchanged since the 1964 aerial photograph.

1980 Aerial Photograph – The property no longer has the residential building as seen in previous aerials, but now has the single north-south trending building located further east on the property. The area to the west and northwest is residential, whereas the area to the east and northeast appears to be commercial and industrial. The area immediately north of the property appears to have undergone significant commercial and industrial development since the 1964 aerial photograph.



### 4.2 Sanborn Maps (Appendix E)

1930 Sanborn Map – The north-south street in front of the property is known as Duer and the east-west street just north of the property is known as Hargrove. The property has an L-shaped residential building and is in a low-density residential neighborhood, with numerous vacant lots in the immediate vicinity.

1948 Sanborn Map – The property itself appears unchanged since 1930. The area to the east of the property also appears mostly unchanged; however, the area to the west of the property appears to have undergone substantial, single-family residential development.

1970 Sanborn Map – The property is now located on NW Pine Avenue, and the area to the east and north has undergone substantial residential and commercial development.

### 4.3 City Directory Abstract Review (Appendix F)

Shell Car Wash #12 is listed for the property from 1973 to the present. From 1968 to 1972 there is no listing for 819 NW Pine Avenue. Prior to 1968 the property was known as 817 Bonners Lane, with Addie Keith listed as the resident. The City Directory also lists the adjacent properties as private residences during this period.

### 4.4 Environmental Database Record Review (Appendix G)

An ASTM standard research environmental data report (EDR) for the property was prepared by EDM, Inc. on August 26, 2003. The EDR includes a search of United States Environmental Protection Agency (USEPA) and Florida Department of Environmental Protection (FDEP) databases which contain information related to releases, potential releases, and/or record keeping. A listing and description of the databases searched by EDM, Inc. and the results of the database search are included in Appendix C. The regulatory agency databases included the following:



### Federal Agency Databases

### **USEPA**

- Comprehensive Environmental Response, Compensation, and Liability Information system (CERCLIS);
- National Priorities List (NPL);
- No Further Remedial Action Planned List (NFRAP);
- Emergency Response Notification System List (ERNS);
- RCRIS Handlers with Corrective Action (CORRACTS);
- RCRA-LQG, SQG, CESQG and Transporters (NONTSD); and
- Archived CERCLIS Sites (NFRAP);

### State of Florida Databases

#### **FDEP**

- Leaking Underground Storage Tanks List (LUST);
- Solid Waste Facilities List (SWF/LF);
- State Funded Action Sites (SHWS);
- Hazardous Waste Compliance & Enforcement Tracking System (STRCRA);
- Facility/Owner/Tank Report (UST);
- Voluntary Cleanup Sites (VCP); and,
- Underground Storage Tanks on Indian Land (INDIAN UST)

### Supplemental Databases

- Biennial Reporting System (BRS);
- Florida Dry Cleaners (DRY);
- Facility Index System List (FINDS);
- PCB Activity Data System (PADS);
- RCRA Administrative Action Tracking System (RAATS);
- Record of Decisions System (RODS);
- Oil and Hazardous Materials Incidents (SPILLS); and,
- Toxic Release Inventory System (TRIS).



Seven sites meeting the ASTM search criteria were identified within the immediate vicinity of the subject property (Table 1). Each of the seven sites is briefly described below.

Jet-Ocala (0.06 miles north of subject site) is located at 852 NW Pine Avenue and appears on the LUST and UST databases. The EDR states that unleaded gasoline was released on November 4, 1991 and that this site is currently closed. The tanks have since been removed from the site. The location (0.06 miles down-gradient — as determined from the 1991 topographic map shown in Figure 1) makes it unlikely that petroleum contamination at this site will impact the subject site.

Reynolds Aluminum (0.08 miles north of subject site) is located at 855 North Pine Avenue and appears on the UST database. The EDR states that this site is currently closed. No releases or open violations were reported.

Marion County Sheriff's Department (0.1 miles north of subject site) is located at 412 NW 9<sup>th</sup> Street and appears on the UST database. The EDR states that this site is currently closed. No releases or open violations were reported.

Budget Muffler (0.11 miles north of subject site) is located at 920 NW Pine Avenue and appears on the UST database. The EDR states that this site is currently closed. No releases or open violations were reported.

Casey's Burger Express, Inc. (0.13 miles north of subject site) is located at 916 North Pine Avenue and appears on the UST database. The EDR states that this site is currently closed. No releases or open violations were reported.

U-Haul Center of Ocala (0.14 miles north of subject site) is located at 1011 NW Pine Avenue and appears on the LUST and UST databases. This site reported a discharge of diesel fuel on December, 1988 and March, 1992. However, there has been no action from the FDEP requiring cleanup. The distance and location (0.14 miles down-gradient, see Table 1) make it unlikely that petroleum contamination at this site, if present, will impact the subject site.

Circle K #8614 (0.16 miles north of subject site) is located at 917 NW Pine Avenue and appears on the LUST and UST databases. This site reported a discharge of vehicular fuels on August 10, 1987. The present cleanup status is inactive. The distance and location (0.16 miles down-gradient from the subject site) make it unlikely that petroleum contamination at this site will impact the subject site.



### 5.0 SITE RECONNAISSANCE

On September 18, 2003, Mr. Philip Glover and Mr. Bob Bretnall of HSW performed a site reconnaissance of the subject site (Figure 3). Appendix H contains a copy of the Environmental Site Assessment Field Checklist used to gather information during the site visit. The subject property is located directly east and across the street (NW Pine Avenue) from Ocala Metal Products. Directly north of the property is a former cash advance building, while to the south and southeast are Jerry's Pawn & Gun and Indoor Archery Range & Army-Navy Surplus. Site photographs taken during the site visit are provided as Figures 4 to 8.

### 5.1 Onsite Features

The subject property is currently a vacant lot. Most of the property's western half is paved with asphalt, with two small parallel grassy areas in the middle of a large concrete pad where the former two pump islands were located. A single ¾-inch pipe was observed protruding from the ground out of one of these locations. A rectangular concrete pad is also present extending from the pump area north to the former UST area, with a single monitoring well (MW-3) on the northern boundary of this location. The property's northern edge contains a destroyed water meter box and two light poles in various states of disrepair can be found on the property's western and southwestern edges.

# HSV.

#### 6.0 INTERVIEWS

9.9578

The owner of 819 NW Pine Avenue is listed as Samuel M. Browder of Knoxville, Tennessee and Naples, Florida. The City of Ocala received an interview questionnaire from Mr. Browder on July 14, 2003 which confirmed that in 1991 there was evidence of stained soil in the tank excavation area during UST abandonment. Mr. Browder also indicated that a Post Storage Tank Removal Assessment was conducted that indicated the presence of petroleum product.

HSW also interviewed Mr. David Payne of Marion County Health. Mr. Payne was not aware of any dumping that may have occurred on this site or any nearby sites, nor was he aware of any conditions on the site that pose a concern to the water supply or public health. However, he did indicate that some adjacent properties, including the U-Haul Center of Ocala and Rainey's Truck Stop, do pose public health concerns. Copies of the questionnaires are provided in Appendix H.



#### 7.0 FINDINGS

Based upon the information made available to HSW or obtained during the ESA, HSW provides the following:

• A discharge of unleaded gasoline was discovered on the subject site on January 30, 1989. No documentation was found describing environmental impacts attributed solely to this release. An additional discharge of kerosene was reported on November 4, 1991. FECC reported that this release did not breach the top of the water table and that all of the impacted soils were removed, resulting in a "No Further Action" recommendation. However, during removal of the UST's, Omega Environmental Services discovered excessively contaminated soil on the southern edge of the UST area. No active cleanup for this release is in progress, due to eligibility changes for petroleum contaminated sites seeking reimbursement for State-funded cleanup with priority scores of less than 50 points (the subject site has a score of 10 points);

Recent discussion with FDEP personnel indicate that neither discharge has been determined to be eligible for a site rehabilitation funding assistance program. Both discharges may be eligible under the Florida Petroleum Liability and Restoration Insurance Program (FPLRIP) or the Petroleum Cleanup Participation Program (PCPP) depending on the nature of the discharge and whether the facility acquired the proper insurance coverage. Questions concerning this situation should be directed to the Eligibility Coordinator with the FDEP.

- HSW did not identify recognized environmental conditions apparent at the surface at 819 NW Pine Avenue, Ocala, FL during the reconnaissance on September 18, 2003;
- Three sites within the immediate vicinity of the subject site (Jet-Ocala, U-Haul Center
  of Ocala, and Circle K #8614) have had historical petroleum releases. The locations
  and/or distances of these sites from the subject site are such that it is unlikely that any
  of these sites have or will impact the subject site.



#### 8.0 OPINIONS

HSW has performed a Phase I Environmental Site Assessment in conformance with the scope of work and limitations of ASTM Practice E-1527-00 of 819 NW Pine Avenue. This assessment has revealed evidence of historical recognized environmental conditions in connection with the property, specifically subsurface contamination related to the petroleum releases on January 30, 1989 and November 4, 1991.



#### 9.0 CONCLUSIONS

HSW has performed a Phase I Environmental Site Assessment in conformance with the scope and limitations of ASTM Practice E 1527-00 of 819 NW Pine Avenue. Any exceptions to, or deletions from, this practice are described in Section 10.0 of this report. This assessment has revealed no evidence of recognized environmental conditions in connection with the property except for the following:

- The discharge of unleaded gasoline on January 30, 1989. No documentation was found describing environmental impacts directly connected with this release.
- The discharge of kerosene on November 4, 1991. Omega Environmental Services discovered excessively contaminated soil in connection with this release on the southern edge of the UST area.



#### 10.0 DEVIATIONS

No significant deviations or deletions were made from the ASTM Practice E 1527-00 standard in conducting this Phase 1 ESA.



#### 11.0 REFERENCES

- City of Ocala. Aerial Photographs.
- City of Ocala Library. Polk City Directories.
- Environmental Data Management, 2003. Environmental Records Review.
- Marion County Fire and Rescue Prevention Division Branch. Storage tank
   facility records
- FDEP Oculus Document Management System
- Marion County Property Appraisers
- U.S. Geological Survey, 1991. 7½ minute Ocala West Quadrangle Map
- Title Search Records
- Interviews with Site Owner; Marion County Health Department Representative

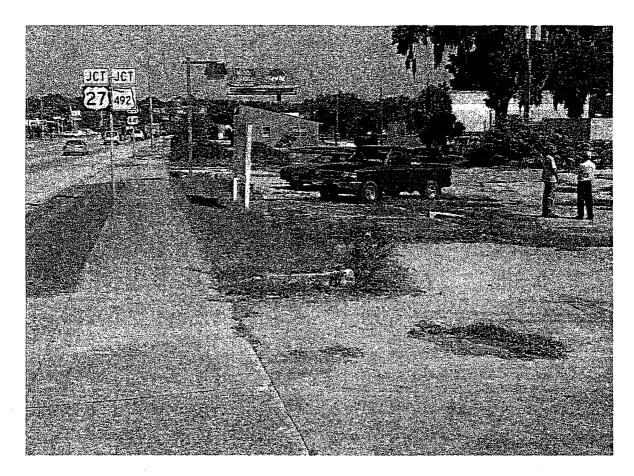


Figure 4. Photograph looking north of subject site.

w/h/g/p



Figure 5. Photograph looking southwest of subject property Showing area of former UST's. Monitor well MW-3 is visible in the center of the photo

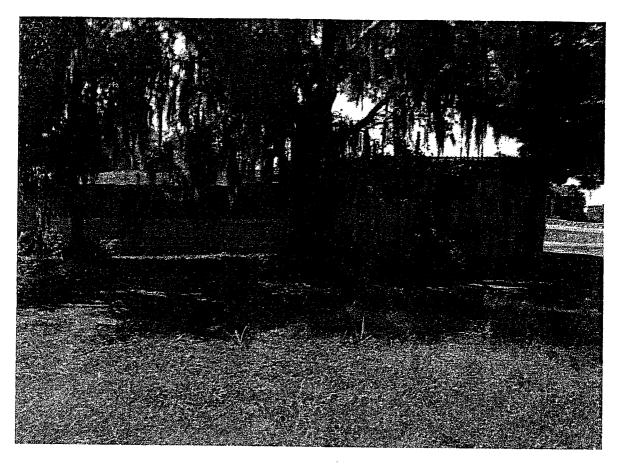


Figure 6. Photograph looking south showing building on adjacent property.



Figure 7. Pipe leading into ground at former pump island location.

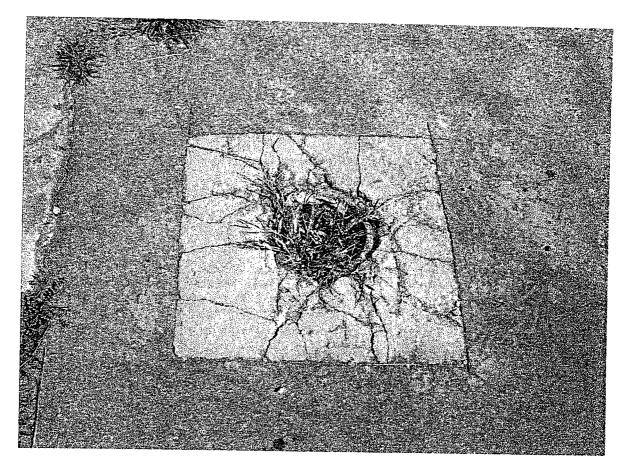


Figure 8. Close-up showing current condition of monitor well MW-3.

## **ADDITIONAL SITE INFORMATION**



# Florida Department of Environmental Regulation

Twin Towers Office Bidg. 2600 Blair Stone Road # Tallahassee, Florida 32399-2400

DER FORM & 17-76 (MOZ	19
Family Change Annual	
Charles Com Decorate	¥ 10. 1990
DER ADDRESS No	(Fded in by DER)

# Closure Assessment Form

es of storage tank systems that are replacing, removing or closing in place storage tanks shall use this form to demonstrate that a storage closure assessment was performed injectoridance with Rule 17-761 or 17-762, Florida Administrative Code. Eligible Early Detection Incended in the control of the contr

Please Print or Type
Complete All Applicable Blanks

Maile: 2/24/92
MER Facility ID Number: 428 5/1 327 3. County: 42 MARTON?
acility Name: ShELL CAR 112 PSH
scilly Owner: CFNTAGE FELL DIC
active Address: 819 WW PINE AUG OCALIS
Meiling Address:
Rephone Number: (905 6 22 - 72 78 9. Facility Operator: 8 405 15 10
the Storage Tank(s): (Circle one or both) A Aboveground or Dunderground
the of Product(s) Stored: W/L (- 14 5 of (H 15 A Tino 17 (- 17 27))
Arp the Innight (Charles and)
Ember of Tanks Closed: 14. Age of Tanks: 1972
A Age of latiks;
Facility Assessment Information
Not Not
No. Applicable
1. Is the facility participating in the Florida Petroleum Liability Insurance and Restoration Program (FPLIRP)?  2. Was a Discharge Reporting Form submitted to the Department?
If yes, When: Where:
3. Is the depth to ground water less than 20 feet?
4: Are monitoring wells present ground the storage system?
If yes, specify type: Water monitoring Vapor monitoring  5. Is there free product present in the monitoring wells or within the excavation?
6. Were the petroletim hydrodarbon vapor levels in the soils greater than 500 parts per million for gasoline?
Specify sample type: Vapor Monitoring wells (Soil sample(s)
7. Were the petroleum hydrodarbon vapor levels in the soils greater than 50 parts per million for diesel/kerosene?  Specify sample type:
8. Were the straight laboratory results of the ground water sample of acceptance than the straight and a property
(See all get letters bit reverse side of this form and supply laboratory data sheets)
9. If a used oil storage system, did a visual inspection detect any discolored soil indicating a release?  10. Are any potable wells located within ¼ of a mile radius of the facility?
11. Is there a surface water body within 4 mile radius of the site? If yes, indicate distance:
<b>麟</b> 海东西大学,一点一点,这个人,只是在这个大学大学。

7 Today 27301-171

Martinest Califolis 7825 Baymandaring May Silve V 20 Jacobson da Farron 20727 804 Feb. 4745 Corard Dawlet Street Made and Suite pa Driverdo: Florida Street Street entraphy (\$45) Benframe David 4570 Oak-Fire Blad Brists Firets 23810 Fpc 612 427 5361

South Depris 8740 Bay St Fort Myon, Plants 20101-201 913-212-5875 Residence Divines Texts & Concerns Max, Burn A Water Public Beneck, Floreto 32 406 (607-433-7650)

DER Ports &	(8) SCOL (8)
Form The	Scenits Assessment Forth
Efection Com	December 10 1986
and the second	on No.

A detailed drawing or sketch of the facility that includes the storage system location, monitoring wells, buildings, storm drains, sample location and dispenser locations must accompany this form.

It a facility has a pollutarit storage tank system that has both gasoline and kerosene/diesel dored on site, both EPA Method 602 and EPA Metho 610 must be performed on the ground water samples obtained.

Amount of salls removed and receipt of proper disposal.

If yes is answered to any one of questions 5.9 a Discharge Reporting Form 17-761,900(1) indicating a suspected release shall be submitted

A copy of this form and any attachments must be submitted to the Department's district office in your area and to the locally administered program office under contract with the Department within 60 days of completion of tank removal or filling a tank with an inert material.

Title of Person Performing Assessment

State Ground Water Target Levels That Affect A Pollutant Storage Tank System Closure Assessment

State ground water larget levels are as follows:

or gasoline (EPA Method 602):

Benzene 1 up/

Total VOA

50 Up/

Benzene

Toluene

Total Xylenes

Ethylbenzene

Methyl Test Butyl 50 ug/f Ether (MTBE)

2. For kerosene/desel (EPA Method 610):

a. Polynucisar Aromatic Hydrocarbons (PAH5) (Best achievable detection limit, 10 ug/l maximum)

FNOYE CHRINGE CUSTERY PATER PECT PISCOVERY OF CONTAMINATION ON (KERO) PUBLLATER STANK CAUITY ShowED HIGHER THAN APPLICALLE 9 U. DEC. 2.28



# Florida Department of Environmental Regulation

Twin Towers Office Didg. . 2500 Diair Stone Road . Tallahassee, Piorida 32399-2400

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## Underground Storage Tank Installation and Removal For Certified Contractors

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	sorida .	Administrativa	Code shall u	on Pile Joseph A	AR 11 OCCUDE 409.113, 1-1	onda Staivies (Certilled contr	actors as defined in Section 17-761.
É		Helenan Balani		Se may lotti to Ci	aunh mer ma justojiogo	in, replacement or femoval	actors as defined in Section 17-761. of the sterage tank system(s) loca
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1	3n /					THE CANDODIA	

eneral Facility Information	•		
DER Facility Identification No. 428 571	327		
1. Stroot Address (absolute localization) \$19	W 145H	Tologhama / First / 2 7 7	
1. Stroot Address (physical location): \$19	W Pin	E PUR DELL	<u> </u>
3 L 6 9 B		DURLA	
Owner Name: CJEATER AL FLA	0,10	Telephone: (PR) 6 7 2	-
Owner Address: FABOL 428	OCHLA	30 600	<u> </u>
ii. Number of Tanke: a. Installed at this time	B) Bomovad a	I this sime of	
Tank(s) Manufactured by:	— Cyntoniovad a	t uns une	
	9 Date Was	rk Completed: Z/Z//8	·
	2. Dato 110	A Completed:	
nderground Pollutant Tank Installation Chec	cklist		
pase cortily the completion of the following installation requ			
	משום אל ביווחוניים וה	nd (X) In the appropriate box,  nd Federal Laws.	

- m Equipment Institute) RP100-07 and the manufacturers' specifications.
- Tanks and piping protosted and installed in accordance with NFPA 30(67). API 1615, PEURP100(UV) and the manufacturers'
- Stool tanks and piping are calhodically protected in accordance with NFPA 30(07). API 1632, UL (Underwriters Laboratory) 1746, STI (Stool Tank institute) R092-89 and the manufacturer's specifications.
- Tanks and piping tested for tightness alter installation in accordance with NFPA 30(07) and PEV/HP100-07.
- Monitoring wall(s) or other loak detection devices installed and tested in accordance with Section 17-761.640, Florida
- Spill and everfill protection devices installed in accordance with Section 17-761.500, F.A.C.
- Secondary containment installed for tanks and piping as applicable in accordance with Section 17-761.500, F.A.C.

lease Note: The numbers following the abbroviations (e.g. API 1615) are publication or specification numbers issued by these instutution

#### Inderground Pollulant Tank Removal Checklist

- Closure assessment performed in accordance with Section 17-761.000, F.A.C.
- Unclorground lank removed and disposed of as specified in API, 1604 in acordance with Section 17.761,000, FA.C

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	Francisco 10, 1995	_
		_
C. 7 7 1 1 -	Find h by DELL	_

#### Certification

terby certify and attest that I am tambar with the facility that is registered with the Florida Department of Environmental Regulation; that if of my knowledge and boted the tank installation; topicoment or removal at this tability was conducted in accordance with Chapter 40: also 6/6303, Florida Statutes and Chapter 17.761, Florida Administrative Code (and its adopted reference thou publications and stank National Fire Protection Association (NFPA), the American Petroleum Institute (API), the National Association of Corresion Engineers (Necesial Society for Tostog and Materials (ASTM), Patroleum Equipment Institute (PEI); Stool Tank Institute (CII); Underwriters Laboratory (UU tank and Integral piping manufacturers' specifications; and that the operations on the checklist were performed accordingly.

Civillied Pphlusan Rank Contractor Name
PSSSC Number

PSSS

The owner or operator of the facility must register the lanks with the Department at least 10 days before the installation. The installar must find form no more than 30 days after the compidition of installation to the Operation of Environmental Regulation at the address printed at a page one.

### **GURR & ASSOCIATES, INC.**

JOB No.: CFOC-004A

DATE: 9/5/91

#### FIELD SOIL TEST RESULTS

		OLVA BIEARIN	S (Unfiltered)	
Number	Concentiation at 1,5 feet (ppm)	Concentration: at 6 (ee) (ppm)	Concentration at 11 feet (ppm)	Concentration at 16 feet (ppin)
SBI	BG	BG	BG	62
SB-2	BG	BG	BG	BG
SB-3 SB-4	BG SS	BG	BG	BG
SB-5	BG	BG	BG	BG
SB-6	860	+1000	+1000	+1000
SB-7	BG BC	BG	other date age age	74
SB-8	BG BC	BG	BG	40
CUC	BG	BG	BG	

	OVA READINGS (FILTERED)	
Sample Concentration	Goncentration Concentration	
Number at 1.5 feet	at 6 feet at 11 feet	
(pem)	(ppm) (ppm)	at 16 feet
SB-1		(PPM)
SB-5 BG	38	BG
SB-7		
		2.8

	OVA
Sample	Concentration
Number	(mqq)
MW-1	80
MW-2	+1000
MW-3	<b>B</b> G
MW-4	BG

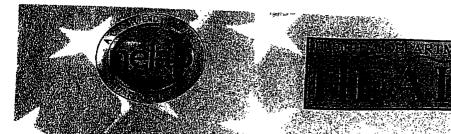
1: All field soil tests conducted according to FDER Chapter 17-770.200(2) F.A.C. soil test procedure utilizing an organic vapor analyzer (Foxboro 128GC)
All values are listed in parts per million (ppm) above BG.

File:\jrs\cfoc4fd.wk1

# BROWNFIELDS ASSESSMENT. OCALA, FLORIDA FOIA 2019-003937

BRIEF DESCRIPTION	
12	
70-1	
	7B-F

# APPENDIX F PC&B NELAP CERTIFICATION INFORMATION





#### State of Florida Department of Health, Bureau of Laboratories

\_\_This is to certify that

E83239

C&B Environmental Laboratory, Inc

1210 Park Road

Ovedo, FL 32765

orida Administrative Code 64E t for the examination of Environmental samples in the following categories:

Dinking Water

Ill Unregulated Contaminants, Primary Inorganic Contaminants, Secondary Contaminants Synthetic Organic Contaminants

Non-Potable Water

iemistry, Metals, Pesticides-Herbicides-PCB's, Volatile Organics

Solid and Chemical Materials

hemistry: Metals, Pesticides-Herbicides-PCB's, Volatile Organics

ontinued certification is contingent upon successful on going compliance with the NELAC Standards and FAC Rule 64E-1 regulations. Specific methods and analytes certified are cited on the Laboratory Scope of Accreditation for this laboratory and are on file at the Bureau of Laboratories, P. O. Box 210, Jacksonville, Florida 32231. Clients and customers are urged to verify with this agency the laboratory's certification status in Florida for particular methods and analytes.

EFFECTIVE JULY 1, 2004

THROUGH JUNE 30, 2005 ...

Ming S. Chan, Ph.D.

Bureau Chief, Bureau of Laboratories Florida Department of Health DH Form 1697, 7/03

NON-TRANSFERABLE 05/03/2004-E83239





**Note:** This list of laboratories is provided by the respective Acrediting Authority. Please contact the Laboratory's Primary Accrediting Authority, or when appropriate, the Secondary Accrediting Authority for 1) specific details of the laboratory's accredited Fields of Testing, 2) methods and analytes, or 3) when there is a descrepancy with the information given.

Paragon Analytics, Inc.	Giby Fort Collins	Sta	ie	PrimeryA	A SecondaryA	CAR	rapi	4 Lace	A	2 Y 100 2 100 100 100 100 100 100 100 100 1
Paragon Analytics, Inc.			(970) 490-1511		FL	-	CW		A SDW/	A C
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	Fort Collins	CO	(970) 490-1511		LADEQ		X	X	X	_T_
ark City Wastewater Treatment Laboratory	Park City	KS	(316) 838-4748	KS	LADEU		X	X_		
BS&J Environmental Toxicology Laboratory	Houston	Tχ	(713) 977-1500		LABEO		X			
BS&J Environmental Toxicology Laboratory	Houston	TX	(713) 977-1500	FL	LA DEQ		X			Т
C&B Environmental Laboratories, Inc	Oviedo	FL	(407) 359-7194				X			$\neg$
CI Labs, Inc	Orangeburg	NY		FL			X	X	X	
Ci/Labs, Inc	Orangeburg		(845) 680-0031		NJ	7	X		X	
DC Laboratories, Inc		NY	(845) 680-0031	NY			X		T X	-+-
DC Laboratories, Inc.	Peoria	IL.	(309) 692-9688	iL		1	X	×	<del> </del>	
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Philip Analytical Services, Inc.			(905) 332-8788		KS	1	X	X		
hoenix Environmental Labs	Burlington	ON	(905) 332-8788		CA		X	X		+-
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itsburg Municipal Wastewater Laboratory	Largo	FL	(727) 582-2302	FL	<del></del>	+	X			
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ant Technicians, Inc	Leesburg	FL	(352) 787-2944	FL	<del> </del>		X			
lattsburgh WPCP Laboratory	Plattsburgh	NY	(518) 563-7172		+	<del> </del>	X		X	$\mathbf{I}^{-}$
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ort Richmond Water Pollution Ctrl Plant		FL	(386) 756-5381	FL		-	<del>  ^</del>	<del></del>	<del>1                                    </del>	┿
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TC Food Chemistry		KS		NY		1	x			
olic Service Testing Lab			(785) 825-1671	KS	T		Х			
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# BROWNFIELDS ASSESSMENT. OCALA, FLORIDA FOIA 2019-003937

FOLDER NUMBER	BRIEF DESCRIPTION	
424-157	TAB 6	

#### DEP-SOP-001/01

## Florida Department of Environmental Protection GROUNDWATER SAMPLING LOG

SITE						SITE	 J:						
WELL	NO:			SAMPL	E ID:			·		DATI	 E:		·
					PUF	RGING D	ATA			!		· · · · · · · · · · · · · · · · · · ·	
DIAM 1 WE	ETER (in):	al) = (TOTAL WE	DEDT	. WELL f (ft): – DEPTH T	O WATE		ATIC DE WATER CAPACIT				WELL CAPAC	ITY (gal/ft):	
PURG		= (		PURGE		) X	PURGE	=			<b>TOT</b> 1		····
METH	OD: VOLUME	CUMUL.	PURGE	DEPTH	AT:		ENDED		·	<u> </u>	TOTAL PURG	L VOL. ED (gal):	<b>.</b>
TIME	PURGED (gal)	VOLUME PURGED (gal)	RATE (gpm)	TO WATER (ft)	рН	TEMP. (°C)	CONE (µmho	<i>'</i> -	DISSOLVED OXYGEN (mg/L)		BIDITY (Us)	COLOR	ODOR
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VELL	CABACITY (Cal	Non 5 - 1)											
VELL	CAPACITY (Gal	llons per Foot):	$0.75^{\circ} = 0.0$					<b>"</b> = 0.	37; 4" = 0.65	5; 5"=	1.02; 6'	" = 1.47; 12"	' = 5.88
SAMPL	ED BY (PRINT)	)/				PLING DA							
SAMPL		7			s	IGNATURE(	S)						
METHO	DD(S):					AMPLING NITIATED AT	:			SAMP		*****	
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	SAMPLE CON SPECIFICA			SAM	IPLE PR	ESERVATIO	N			INT	ENDED	ANALYSIS	
NO.	MATERIAL CODE	VOLUME		ERVATIVE USED		TAL VOLUM D IN FIELD		INAL pH	-			METHOD	
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REMARI	<u>/6:</u>												
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MATERI	AL CODES: A	G = AMBER GL	ASS; CG	= CLEAR GI	LASS;	PE = POLYE	THYLEN	IE: (	O = OTHER (	SPECIE	<b>Y</b> 1		

NOTE: The above do not constitute all of the information required by Chapter 62-160, F.A.C.

# PC&B Environmental

210 Park Road, Oviedo, FL 32765 407-359-7194 (FAX) 407-359-7197

COMPANY:

ADDRESS:

SAMPLED BY:

PHONE:

21341

ō Page Work Order: Date: ANALYSIS REQUESTED PRESERVATION PROJECT INFORMATION Chain of Custody DATE/TIME RETAN DATE/TIME RECEIVED BY DATE/TIME SIGN: FAX: SAMPLE ID

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SAMPLE RECEIPT

PROJECT NAME:

Total # of Containers

Recv'd in Good Condition

PO #:

PROJECT MANAGER:

SITE ADDRESS:

PROJECT #:

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RELINQUISHED BY

10

ω O 7 12 SPECIAL INSTRUCTIONS/COMMENTS:

QUOTE/CONTRACT #:

INVOICE TO:

Chain of Custody Seals

# FT 1000 General Field Testing and Measurement

#### Field Instrument Calibration Records

INSTRUM	IENT (M	AKE/MOD	INSTRUM	NENT #				
PARAME	TER: [c	heck only	one]					
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☐ TUR	BIDITY		RESIDUAL	L CL 🔲 [	00	□ отн	IER	
values, and	STANDARDS: [Specify the type(s) of standards used for calibration, the origin of the standards, the standard alues, and the date the standards were prepared or purchased]							
Standa	ard A					<u> </u>		
Standa	ard B							
Standa	Standard C							
DATE (yy/mm/dd)	TIME (hr:min)	STD (A, B, C)	STD VALUE	INSTRUMENT RESPONSE	% DEV	CALIBRATED (YES, NO)	TYPE (INIT, CONT)	SAMPLER INITIALS
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DATE	TIME	STD	STD	INSTRUMENT		CALIBRATED	TVDE	CAMPLED
(yy/mm/dd)	(hr:min)	STD (A, B, C)	VALUE	INSTRUMENT RESPONSE	% DEV	CALIBRATED (YES, NO)	TYPE (INIT, CONT)	SAMPLER INITIALS
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## FT 1000 General Field Testing and Measurement

## Field Instrument Maintenance Records

INSTRUM	MENT (N	IAKE/MODEL#)			INSTRUMENT #	
DATE OF	PURC	HASE:	(	new; used)	₩ <del></del>	
PARAME	TER(S):	: [check all that	apply for this	s instrument1	•	
☐ TEM	IPERATU	RE 🗌 COND	UCTIVITY	☐ SALINITY	□pH □ ORP	
☐ TUR	BIDITY	RESID	UAL CL.	□ DO	OTHER	
DATE (yy/mm/dd)	TIME (hr:min)	TYPE OF MAINTENANCE	DESCR	RIPTION OF PERFO	RMED MAINTENANCE	SAMPLE
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MARKS:						
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# BROWNFIELDS ASSESSMENT. OCALA, FLORIDA FOIA 2019-003937

FOLDER NUMBER	BRIEF DESCRIPTION	
424-157	TAB H	
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# APPENDIX H FORM L INFORMATION

601

	601			
ARAMETER	MDL	ACCURACY	PRECISION	PQL
Bromobenzene	1.0 ug/l	92 +/- 16	0-8	1.0 ug/l
3romodichloromethane	1.0 ug/l	96 +/- 12	0-12	1.0 ug/l
3romoform	1.0 ug/l	88 +/- 21	0-15	1.0 ug/l
Bromomethane	1.0 ug/l	91 +/- 22	0-20	1.0 ug/l
Carbon Tetrachloride	1.0 ug/l	89 +/- 14	0-16	1.0 ug/l
Chlorobenzene	1.0 ug/l	101 +/- 18	0-11	1.0 ug/l
Chloroethane	1.0 ug/l	87 +/- 22	0-19	1.0 ug/l
?-Chloroethyl vinyl Ether	1.0 ug/l	94 +/- 12	0-12	1.0 ug/l
Chloroform	1.0 ug/l	99 +/- 12	0-9	1.0 ug/l
Chloromethane	1.0 ug/l	98 +/- 21	0-7	1.0 ug/l
Dibromocloromethane	1.0 ug/l	105 +/- 9	0-9	1.0 ug/l
Dibromomethane	1.0 ug/l	95 +/- 10	0-9	1.0 ug/l
1,2 Dichlorobenzene	1.0 ug/l	104 +/- 9	0-6	1.0 ug/l
1,3 Dichloroethene	1.0 ug/l	101 +/- 6	0-6	1.0 ug/l
1,4 Dichlorobenzen	1.0 ug/l	106 +/- 10	0-9	1.0 ug/l
1,1 Dichloroethane	1.0 ug/l	108 +/- 12	0-12	1.0 ug/l
Dichlorodifluoromethane	1.0 ug/l	98 +/- 12	0-12	1.0 ug/l
1,2 Dichloroethane	1.0 ug/l	110 +/- 18	0-18	1.0 ug/l
,1 Dichloroethene	1.0 ug/l	108 +/- 12	0-12	1.0 ug/l
trans-1,2 Dichloroethene	1.0 ug/l	109 +/- 6	0-6	1.0 ug/l
1,2 Dichloropropane	1.0 ug/l	105 +/- 6	0-6	1.0 ug/l
is-1,3 Dichloropropene	1.0 ug/l	103 +/- 3		1.0 ug/l
trans-1,3 Dichloropropene	1.0 ug/l	99 +/- 3		1.0 ug/l
Methylene Chloride	1.0 ug/l	126 +/- 18		1.0 ug/l
1,1,2,2-Tetrachloroethane	1.0 ug/l	98 +/- 9		1.0 ug/l
i,1,1,2-Tetrachloroethane	1.0 ug/l	100 +/- 6		1.0 ug/l
Tetrachloroethene	1.0 ug/l	103 +/- 6		1.0 ug/l
i,1,1-Trichloroethane	1.0 ug/l	91 +/- 6		1.0 ug/l
1,1,2-Trichloroethane	1.0 ug/l	100 +/- 9		1.0 ug/l
Trichloroethene	1.0 ug/l	92 +/- 9		1.0 ug/l
Frichlorofluoromethane	1.0 ug/l	105 +/- 9		1.0 ug/l
,,2,3-Trichloropropane	1.0 ug/l	101 +/- 12		1.0 ug/l
Vinyl Chloride	1.0 ug/l	110 +/- 18		1.0 ug/l
is 1,2-Dichloroethene	1.0 ug/i	109 +/- 6		1.0 ug/l

	TABLE 2			
	602			
PARAMETER	MDL	ACCURACY	PRECISION	PQL
Benzene	1.0 ug/l	105 +/- 12	0-12	1.0 ug/l
Chlorobenzene	1.0 ug/l	102 +/- 15	0-15	1.0 ug/l
1,2-Dichlorobenzene	1.0 ug/l	104 +/- 6	0-6	1.0 ug/l
1,3-Dichlorobenzene	1.0 ug/l	101 +/- 6	0-6	1.0 ug/l
₹,4-Dichlorobenzene	1.0 ug/l	106 +/- 9	0-9	1.0 ug/l
<b>≟</b> thylbenzene	1.0 ug/l	101 +/- 15	0-15	1.0 ug/l
MTBE	5.0 ug/l	118 +/- 24	0-24	5.0 ug/l
Foluene	1.0 ug/l	98 +/- 6	0-6	1.0 ug/l
n&p Xylenes	1.0 ug/l	100 +/- 12	0-12	1.0 ug/l
o-Xylene	1.0 ug/l	100 +/- 12	0-12	1.0 ug/l

1ABLE 3 8021				
PARAMETER	MDL	ACCURACY	PRECISION	PQL
Bromobenzene	1.0 ug/l	75-120	20	5 ug/kg
Bromodichloromethane	1.0 ug/l	75-120	20	5 ug/kg
Bromoform	1.0 ug/l	75-120	20	5 ug/kg
Bromomethane	1.0 ug/l	75-120	20	5 ug/kg
Carbon Tetrachloride	1.0 ug/l	49-148	15	5 ug/kg
Chlorobenzene	1.0 ug/l	66-130	18	5 ug/kg
Chloroethane	1.0 ug/l	75-120	20	5 ug/kg
2-Chloroethyl vinyl Ether	1.0 ug/l	70-125	20	5 ug/kg
Chloroform	1.0 ug/l	75-120	20	5 ug/kg
Chloromethane	1.0 ug/l	75-120	20	5 ug/kg
Dibromocloromethane	1.0 ug/l	75-120	20	5 ug/kg
Dibromomethane	1.0 ug/l	75-120	20	5 ug/kg
1,2 Dichlorobenzene	1.0 ug/l	75-120	20	5 ug/kg
1,3 Dichloroethene	1.0 ug/l	75-120	20	5 ug/kg
1,4 Dichlorobenzene	1.0 ùg/l	75-120	20	5 ug/kg
1,1 Dichloroethane	1.0 ug/l	75-120	20	5 ug/kg
Dichlorodifluoromethane	1.0 ug/l	75-120	20	5 ug/kg
1,2 Dichloroethane	1.0 ug/l	75-120	20	5 ug/kg
1,1 Dichloroethene	1.0 ug/l	51-150	18	5 ug/kg
trans-1,2 Dichloroethene	1.0 ug/l	75-120	20	5 ug/kg
1,2 Dichloropropane	1.0 ug/l	75-120	20	5 ug/kg
cis-1,3 Dichloropropene	1.0 ug/l	70-125	20	5 ug/kg
trans-1,3 Dichloropropene	1.0 ug/l	70-125	20	5 ug/kg
Methylene Chloride	1.0 ug/l	75-120	20	5 ug/kg
1,1,2,2-Tetrachloroethane	1.0 ug/l	75-125	20	5 ug/kg
1,1,1,2-Tetrachloroethane	1.0 ug/l	75-120	20	5 ug/kg
Tetrachloroethene	1.0 ug/l	75-120	20	5 ug/kg
1,1,1-Trichloroethane	1.0 ug/l	75-120	20	5 ug/kg
1,1,2-Trichloroethane	1.0 ug/l	75-120	20	5 ug/kg
Trichloroethene	1.0 ug/l	59-144	18	5 ug/kg
Trichlorofluoromethane	1.0 ug/l	70-125	20	5 ug/kg
1,2,3-Trichloropropane	1.0 ug/l	75-120	20	5 ug/kg
Vinyl Chloride	1.0 ug/l	75-120	20	5 ug/kg
cis 1,2-Dichloroethene	1.0 ug/l	75-120	20	5 ug/kg
Benzene	1.0 ug/l	59-143	18	5 ug/kg
Ethylbenzene	1.0 ug/l	42-157	19	5 ug/kg
MTBE	5.0 ug/l	70-125	20	5 ug/kg
Toluene	1.0 ug/l	75-120	20	5 ug/kg
m&p Xylenes	1.0 ug/l	75-120	20	5 ug/kg
o-Xylene	1.0 ug/l	75-120	20	5 ug/kg
Bromochloromethane	1.0 ug/l	75-120	20	5 ug/kg
n-Butylbenzene	1.0 ug/l	75-120	20	5 ug/kg
sec-Butylbenzene	1.0 ug/l	75-120	20	5 ug/kg
tert-Butylbenzene	1.0 ug/l	75-120	20	5 ug/kg
2-Chlorotoluene	1.0 ug/l	75-120 75-400	20	5 ug/kg
4-Chlorotoluene	1.0 ug/l	75-120 75-420	20	5 ug/kg
1,3 Dichloropropane	1.0 ug/l	75-120 75-120	20	5 ug/kg
2,2 Dichloropropane	1.0 ug/l	75-120 75-120	20 20	5 ug/kg 5 ug/kg
1,1 Dichloropropene	1.0 ug/l	75-120		o ug/kg

		I ABLE 4		j
		TPH-FL (Water	.)	
PARAMETER	MDL	ACCURACY	PRECISION	PQL
Total PHS	1 mg/l	84-111	4.6	1 mg/l

		TABLE 5 TPH-FL (Soil)		
PARAMETER	MDL		PRECISION	PQL
Total PHS	4.0 mg/l	53-111	11	4.0 mg/l

TABLE 6 8100									
PARAMETER	MDL	ACCURACY	PRECISION	PQL					
Acenaphthene	70 ug/kg	68-112	8	160 ug/kg					
Acenaphthylene	70 ug/kg	67-115		160 ug/kg					
Anthracene	70 ug/kg	69-120		160 ug/kg					
Benzo(a)anthracene	70 ug/kg	73-133	14	160 ug/kg					
Benzo(a)pyrene	70 ug/kg	69-124		160 ug/kg					
Benzo(b)fluoranthene	70 ug/kg	69-114		160 ug/kg					
Benzo(ghi)perylene	70 ug/kg	68-111		160 ug/kg					
Benzo(k)fluoranthene	70 ug/kg	65-126		160 ug/kg					
Chrysene	70 ug/kg	80-119		160 ug/kg					
Dibenzo(ah)anthracene	70 ug/kg	68-121		160 ug/kg					
Fluoranthene	70 ug/kg	70-128		160 ug/kg					
Fluorene	70 ug/kg	74-131		160 ug/kg					
Indeno(123cd)pyrene	70 ug/kg	69-129		160 ug/kg					
Napthalene	70 ug/kg	73-119		160 ug/kg					
1-Methyl naphthalene	70 ug/kg	76-117	14	160 ug/kg					
2-Methyl naphthalene	70 ug/kg	74-114		160 ug/kg					
Phenanthrene	70 ug/kg	73-106		160 ug/kg					
Pyrene	70 ug/kg	75-134		160 ug/kg					

TABLE 7								
8310								
PARAMETER	MDL	ACCURACY	PRECISION	PQL				
Acenaphthene	10 ug/l	45-133	33	5 ug/l				
Acenaphthylene	10 ug/l	45-133		5 ug/l				
Anthracene	10 ug/l	45-133		5 ug/l				
Benzo(a)anthracene	.20 ug/l	45-133		.2 ug/l				
Benzo(a)pyrene	.20 ug/l	45-133		.25 ug/l				
Benzo(b)fluoranthene	.20 ug/l	45-133		.2 ug/l				
Benzo(ghi)perylene	10 ug/l	45-133	1	.2 ug/l				
Benzo(k)fluoranthene	.50 ug/l	45-133		.25 ug/l				
Chrysene	2 ug/l	45-133		.01 ug/l				
Dibenzo(ah)anthracene	.20 ug/l	45-133		.2 ug/l				
Fluoranthene	10 ug/l	45-133		.2 ug/l				
Fluorene	10 ug/l	45-133		.01 ug/l				
Indeno(123cd)pyrene	.20 ug/l	45-133		.10 ug/l				
Napthalene	1.0 ug/l	45-133		.05 ug/l				
1-Methyl naphthalene	1.0 ug/i	45-133		.05 ug/l				
2-Methyl naphthalene	1.0 ug/l	45-133		.05 ug/l				
Phenanthrene	10 ug/l	45-133		.025 ug/l				
Pyrene	10 ug/l	45-133		.25 ug/l				

# BROWNFIELDS ASSESSMENT. OCALA, FLORIDA FOIA 2019-003937

FOLDER NUMBER	BRIEF DESCRIPTION	<del></del>
424-157	TABI	

#### **APPENDIX I**

# APPLICABLE FDEP CHAPTER 62-160, FAC SOP'S FOR FIELD SAMPLING ACTIVITIES

I-1	FA 1000 - Regulatory Scope and Administrative Procedures for Use of DEP SOPs
I-2	FC 1000 - Cleaning Procedures
1-3	FD 1000 - Documentation Procedures
I-4	FQ 1000 - Field Quality Control Requirements
I-5	FS 2200 - Groundwater Sampling
I-6	FS 3000 - Soil
1-7	FT 1100 - Field Measurement of Hydrogen Ion Activity (pH)
1-8	FT 1200 - Field Measurement of Specific Conductivity
I-9	FT 1400 - Field Measurement of Temperature
I-10	FT 1500 - Field Measurement of Dissolved Oxygen
I-11	FT 1600 - Field Measurement of Turbidity
I-12	FT 1000 - General Field Testing and Measurement

# BROWNFIELDS ASSESSMENT. OCALA, FLORIDA FOIA 2019-003937

FOLDER NUMBER	BRIEF DESCRIPTION	
424-157	APPEN 1-1	
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# APPENDIX I-1 FA 1000 - REGULATORY SCOPE AND ADMINISTRATIVE PROCEDURES FOR USE OF DEP SOPs

# FA 1000. REGULATORY SCOPE AND ADMINISTRATIVE PROCEDURES FOR USE OF DEP SOPS

## FA 1100. Intent and Purpose

This administrative SOP provides guidance and specific instructions concerning the organization and regulatory use of the various components of the collection of DEP SOPs found in DEP-SOP-001/01 (Field Procedures) and DEP-SOP-002/01 (Laboratory Procedures). For those situations where procedures alternative to the DEP SOPs are proposed, see FA 2100, Application to Use Alternative Procedures. In addition, quality assurance management recommendations and requirements for implementation of the DEP SOPs are discussed in FA 3000, Quality Systems. Auditing protocols used by DEP to evaluate individuals and organizations for compliance with the DEP SOPs are described in FA 4000. Minimum personnel qualifications required for certain DEP SOP activities are listed in FA 5000. Definitions and terms used throughout the DEP SOPs are included in the Tables and Glossary included in the Appendix to FA 1000.

1. TERMS SPECIFIC TO RECOMMENDED AND REQUIRED PROCEDURES

Although the entire collection of DEP SOPs comprises minimum requirements under the DEP Quality Assurance Rule, 62-160, F.A.C., certain provisions in the DEP SOPs specifically describe recommendations that are suggestive and not mandatory. In addition, certain requirements may likewise be emphasized in the text of DEP SOPs according to the terms defined below.

- 1.1. When the words "shall" or "must" are associated with a procedure or other item, the item is mandatory and required in all cases.
- 1.2. When the words "should" or "may" are used, the referenced item is recommended or suggested but not mandatory.
- 2. COMPLIANCE WITH HEALTH & SAFETY AND WASTE DISPOSAL REGULATIONS

The collection of DEP SOPs is not intended to provide guidance on compliance with personal protection, health & safety or waste disposal regulations. Users of the DEP SOPs should ensure that the requirements of all local, state and federal regulations concerning personal protection, health & safety planning and the storage and disposal of any hazardous or investigation-derived wastes are fulfilled when performing the procedures described in the DEP SOPs.

3. DISCLAIMER FOR USE OF TRADE NAMES

Trade names are used in certain DEP SOPs to provide examples of equipment or materials appropriate for use according to the indicated procedures. Other brand names of equipment of equivalent design, construction materials and function may be used interchangeably. The use of trade names by DEP does not indicate an endorsement of any commercial product. In rare instances, the listed brand name may be the only item or material of its kind available meeting specifications required by the associated DEP SOP.

## FA 1200. Regulatory Use

All parties producing data for use by DEP are required to use applicable DEP SOPs per the DEP Quality Assurance Rule, 62-160.200 & .320, F.A.C.

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FA 1000: Regulatory Scope and Administrative Procedures for Use of DEP SOPs

## FA 1210. EXCEPTIONS TO USE

Activities exempted from mandatory use of the DEP SOPs are indicated in the DEP Quality Assurance Rule, 62-160.110 & .210, F.A.C.

## FA 1300. Format, Definitions and Terms

### FA 1310. SOP FORMAT

The SOPs are divided into major topic areas

- 1. FA: ADMINISTRATION:
  - 1.1. Outlines the intended use and scope of the SOPs
  - 1.2. Defines:
    - 1.2.1. Terms
    - 1.2.2. Matrices
    - 1.2.3. Analyte groups
  - 1.3. Outlines procedures to be used when applying for alternative field procedures and how they will be used.
  - 1.4. Discusses the required elements of a quality system, personnel responsibilities and the quality manual.
  - 1.5. Describes auditing procedures used by DEP to evaluate individuals and organizations for compliance with the DEP SOPs.
  - 1.6. Lists personnel qualifications required for performing certain procedures in the DEP SOPs.
- 2. FC: CLEANING PROCEDURES: Outlines appropriate cleaning procedures for field equipment and sample containers.
- 3. FD: FIELD DOCUMENTATION:
  - Summarizes the types of documentation and records that must be maintained.
  - 3.2. Provides field forms that may be used by organizations.
- 4. FM: FIELD PLANNING AND MOBILIZATION:
  - 4.1. Discusses recommended procedures for obtaining laboratory services.
  - 4.2. Discusses recommended activities to be performed before beginning a sample collection project.
- 5. FQ: FIELD QUALITY CONTROL:
  - 5.1. Discusses the types of quality control measures that may be used by sampling organizations.
  - Outlines the mandatory quality control samples to be collected.
  - 5.3. Discusses the quality control measures that are associated with field measurements.
- 6. FS: FIELD SAMPLING: Discusses sample collection procedures based on source:

Page 2 of 32

FA 1000: Regulatory Scope and Administrative Procedures for Use of DEP SOPs

- 6.1. General sampling procedures applicable to all sampling activities including construction materials, container types, preservation and holding times.
- 6.2. General aqueous sampling procedures applicable to collecting all water samples
- 6.3. Specific SOPs for:
  - Surface Water
  - Groundwater
  - Drinking water
  - Wastewater
  - Soils
  - Sediment
  - Waste
  - Biological Tissues
  - Biological Community
  - Contaminated Surface Sampling
  - Ultra Trace Metal Sampling
- 7. FT: FIELD TEST MEASUREMENTS: Discusses procedures to calibrate and maintain instruments and perform field measurements for:
  - pH
  - Specific Conductance
  - Salinity
  - Temperature
  - Dissolved Oxygen
  - Turbidity
  - Light Penetration (Transparency and Secchi Depth)
  - Water Flow and Velocity (Discharge)
  - Multi Parameter Meters
  - Residual Chlorine
  - Sulfites
  - Ferrous Iron
  - Combustible and Explosive Gases
  - Oxidation Reduction Potential
  - Sediment Oxygen Demand
  - Aquatic Biological Habitat Characterization

FA 1000: Regulatory Scope and Administrative Procedures for Use of DEP SOPs

- 8. LD: DOCUMENTATION FOR LABORATORY PROCEDURES: Lists documentation requirements for the following laboratory procedures not discussed in the NELAC Quality Systems standards:
  - Determination of Biological Indices
  - Quality Control for Biological Community Analysis
- 9. LQ: LABORATORY QUALITY CONTROL: Describes quality control for the following laboratory procedures not discussed in the NELAC Quality Systems standards:
  - Benthic Macroinvertebrate Taxonomic Identification and Enumeration
- 10. LT: LABORATORY TESTING PROCEDURES: Describes laboratory methods for procedures not discussed in the NELAC Quality Systems standards:
  - Biological laboratory procedures for taxonomic identification and enumeration of benthic macroinvertebrates
  - Calculation of Biorecon, Stream Condition and Lake Condition indices

## FA 1320. SOP GLOSSARY

The glossary, found in FA 1000, Appendix A defines the terms used throughout the DEP SOPs.

## FA 1330. MATRIX DEFINITIONS

Table FA 1000-1 identifies and defines the sample-collection matrices that are used throughout the DEP SOPs.

## FA 1340. ANALYTE GROUP DEFINITIONS

Tables FA 1000-2 and FA 1000-3 identify and define the sample-collection analyte groups as used throughout the DEP SOPs.

## FA 2000. GENERAL ADMINISTRATIVE PROCEDURES

## FA 2100. Application to Use Alternative Procedures

1. INTRODUCTION

When protocols described in the collection of DEP SOPs are unsuitable for a specific application, use alternative procedures approved by DEP according to the following conditions and instructions.

- 2. SCOPE, REGULATORY REQUIREMENTS AND EXCLUSIONS
  - 2.1. The procedures in the DEP SOPs are minimum requirements for sample collection, sample handling, field testing and certain laboratory procedures used to generate data for DEP use. Per the DEP Quality Assurance Rule, 62-160.210 & .330, F.A.C., alternative and new procedures require preapproval by DEP before use on a project. Apply for approval to use alternatives to the DEP SOPs except for those DEP SOPs and alternative or new procedures described or listed in sections 2.1.1 2.3 below.
    - 2.1.1. Certain DEP SOPs will provide for allowable alternatives to the indicated procedures. See specific SOPs for a description of these preapproved alternatives.

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- 2.1.2. Per the DEP Quality Assurance Rule, 62-160.600, F.A.C., procedures employed for research purposes are not considered alternative procedures. Submit applications for approval of proposed alternative or new procedures only where permits, consent decrees or other legal orders, voluntary agreements or contract provisions have specified a *required* use of the DEP SOPs for research projects and alternative procedures are instead proposed.
  - 2.1.2.1. Submit research procedures proposed to be incorporated into the collection of DEP SOPs according to FA 2240 below.
- 2.1.3. Alternative or new procedures submitted in DEP-approved Quality Assurance Plans prior to the adoption of the collection of DEP SOPs in SOP-DEP-001/01 and SOP-DEP-002/01 may be approved by DEP for future specific projects without modification. In these cases, the requirements indicated in FA 2200 FA 2230 may be waived by DEP.
- 2.1.4. Per the DEP QA Rule, 62-160.210, F.A.C., alternative or new procedures submitted under the provisions of DEP contracts, permits or orders and approved by DEP prior to the effective date of the collection of DEP SOPs in SOP-DEP-001/01 and SOP-DEP-002/01 remain approved for the duration of the project associated with the contract, permit or order. The requirements indicated in FA 2200 FA 2230 are waived for these procedures.
- 2.1.5. Procedures used by the DEP Bureau of Emergency Response or its designated representatives and contractors to collect samples under regulations governing emergency response incidents may deviate from the requirements in the DEP SOPs without preapproval to the extent necessary to protect human health, public safety and the environment. The requirements indicated in FA 2200 FA 2230 are waived for these procedures.

## 2.2. <u>DEP SOPs Not Requiring Preapproved Alternatives</u>

- FC 1000-1430 and Appendix
- FS 8200

## 2.3. <u>Excluded Modifications to DEP SOPs</u>

The following DEP SOPs cannot be modified or replaced by alternative or new procedures:

- FS 7000, Biological Community Sampling
- FT 3000, Biological Habitat Assessment
- LT 7000, Determination of Biological Indices

## FA 2200. Review and Approval of Alternative Procedures

#### 1. GENERAL INSTRUCTIONS

1.1. Submit all applications for alternative procedures to the DEP project manager assigned to the site, project, permit or contract. Do not send applications to DEP headquarters offices in Tallahassee unless the project manager is stationed in Tallahassee or the application is submitted for general approval as a statewide-use procedure.

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- 1.2. Do not commence using the alternative procedure until approval is granted by DEP.
  - 1.2.1. DEP may impose specific conditions on the use of the alternative procedure or request modifications to the procedure before approval.

## FA 2210. GENERAL DESCRIPTION OF ALTERNATIVE PROCEDURES

The degree of modification of a published DEP SOP or the specifications of a proposed new procedure will in part determine whether the procedure is deemed alternative. Evaluate proposed procedures according to the following criteria in determining whether to apply for alternative or new procedure approval.

1. Included Modifications and Effects Associated with Alternative or New Sampling Procedures:

Procedures containing the following modifications or potentially producing the indicated effects require the submittal of applications for approval as alternative or new procedures.

- 1.1. Step-wise, procedural modifications using the equipment specified in an affected FDEP SOP that alter the integrity, nature or representativeness of the sample, as determined by comparison with the published DEP SOP.
  - 1.1.1. Where the proposed alternative is claimed to offer an improvement over the published DEP SOP, this criterion may facilitate approval.
- 1.2. Modifications in the use of materials of construction of equipment or containers that may potentially contaminate the sample with substances that may interfere with sample preservation or analysis or that may otherwise result in a loss or fortification (contamination) of analytes or parameters of interest in the sample
- 1.3. Use of substantially different equipment as an alternative to the equipment prescribed in the affected DEP SOP.
- 1.4. Use of substitute reagents or chemicals, where applicable, to sample collection procedures.
- 1.5. Use of entirely new procedures or technology not discussed in the DEP SOPs. These procedures are defined as **new procedures**.
- 2. MODIFICATIONS TO FIELD TESTING METHODS AND NEW FIELD TESTING METHODS

Alternative field-testing methods of all types are subject to the provisions of the DEP Quality Assurance Rule, 62-160.330 FAC, for approval of alternative analytical methods.

3. MODIFICATIONS TO SAMPLE PRESERVATION PROTOCOLS/NEW PRESERVATION PROTOCOLS

Sample preservation procedures of all types are subject to the provisions of the DEP Quality Assurance Rule, 62-160.400 F.A.C., which references approved sample preservation protocols listed in FS 1000. Alternative procedures for sample preservation, container types and sample storage are subject to the preapproval requirements described in FA 2100 – FA 2230.

## FA 2220. GENERAL CRITERIA FOR APPROVAL OF ALTERNATIVE PROCEDURES

- 1. The approval of all proposed alternative and new procedures is dependent upon fulfillment of the following general criteria.
  - 1.1. Alternative procedures must be appropriate for the Data Quality Objectives (DQOs) established for the project for which the alternative procedure is proposed.

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- 1.2. Where applicable, the alternative procedure must be demonstrated to be equivalent to the DEP SOP that the alternative procedure is proposed to replace. Performance that exceeds the performance of the published DEP SOP may satisfy this requirement.
- 1.3. Approval may not be granted if the procedure produces data unusable by DEP for the fulfillment of DQOs, or if the procedure produces data that are not comparable to or are otherwise incompatible for use with existing DEP data generated by other approved procedures.
- 1.4. Approval may not be granted if the alternative procedure is shown to produce data at obvious risk of being invalidated according to the requirements of the DEP Quality Assurance Rule, 62-160.670, F.A.C. or according to data validation criteria established by DEP as specific DQOs for the affected project(s).
- 1.5. Procedures developed by consensus or standardization organizations, such as ASTM, EPA or USGS, or by manufacturers or vendors and derived from collaborative studies, will be considered on merit for approval as published by the standard-setting organization or commercial interest.
- 1.6. Approval of alternative or new procedures of all types is independent of the operating party and may be used by any entity for the affected project for which the procedure is approved.
- 1.7. Each proposed alternative or new procedure will be evaluated on an individual basis against these criteria according to the specific requirements of the project for which the alternative or new procedure will be used.
- 2. Although most requests for alternative procedure approval must be routed through the designated DEP project or contract manager for a site or project, approval will be granted by DEP through internal review that includes other staff in addition to the project manager.
- 3. See additional discussion for statewide-use approval in FA 2230, section 2.

## FA 2230. PROJECT-SPECIFIC AND STATEWIDE-USE ALTERNATIVE PROCEDURES

The protocol for applying for alternative procedure approval differs depending on whether the alternative or new procedure is intended for project-specific or statewide use, and will determine the scope of approval for the procedure.

- 1. PROJECT-SPECIFIC ALTERNATIVE FIELD PROCEDURES: Submit all applications for project-specific alternative or new procedures to the DEP project manager assigned to the project, legal case, site, permit, order, contract or other agreement. Approvals of project-specific procedures are subject to the following:
  - 1.1. Apply for project-specific alternative procedures on a site or project basis. The approval will not be portable and the alternative procedures cannot be used on other sites or projects, but may be used by any party performing the alternative procedure approved for the affected project.
    - 1.1.1. Alternative procedures employed for experimental purposes where data derived from the alternative procedure will not be used by DEP may be handled informally with the DEP project manager and are not subject to the approval requirements of this SOP.
    - 1.1.2. The statewide-use application will not be required for any project-specific approval, but a statewide-use approval for an alternative procedure may satisfy project-specific approval requirements.

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- 2. STATEWIDE-USE ALTERNATIVE FIELD PROCEDURES:
  - 2.1. Submit applications for approval for alternative or new procedures for statewide use for general approval or for use on multiple sites in the state.
    - 2.1.1. Statewide-use procedures require the design of a collaborative multi-party study to investigate the efficacy of the proposed procedure for specified site conditions and sample types. An evaluation of the proposed procedure on multiple sites may be required. Each application will be considered on a case-by-case basis by DEP. Approval for statewide use does not guarantee applicability of the procedure for all projects.
    - 2.1.2. The statewide-use application will not be required for any project-specific approval, but a statewide-use approval for an alternative or new procedure may satisfy project-specific approval requirements.
  - 2.2. Submit written study designs and applications for approval to the DEP project manager assigned to the project, site, permit, case, contract or other agreement. If the procedure is being submitted for general approval and not for use on a specific project, submit the application for approval to the Environmental Assessment Section (EAS) at DEP headquarters in Tallahassee.
    - 2.2.1. Consult with the DEP project manager or the EAS prior to submittal. The format and content of the application, as well as the study design, will be determined on a case-by-case basis in collaboration with all affected parties.
  - 2.3. Procedures approved for statewide use become part of the public domain and are made available to any party.
    - 2.3.1. DEP will not accept applications for alternative or new procedures for statewide use where proprietary rights, exclusive use or other limitations on use of the procedures are claimed.

## FA 2240. Addition of Alternative Procedures to the Collection of FDEP SOPs

- 1. Incorporation of procedures or methods into the collection of DEP SOPs requires approval of the procedure or method for Statewide Use, per the DEP Quality Assurance Rule, 62-160.210 & .330, F.A.C.
  - 1.1. See FA 2230, section 2, above.
- 2. Upon request to the Environmental Assessment Section at DEP headquarters in Tallahassee, and after approval for statewide use, the procedure will be added to the collection of FDEP SOPs at the next publication date.
  - 2.1. Approval for statewide use is effective at the time of original approval of the procedure or method, regardless of publication date of the revised collection of DEP SOPs.

## FA 3000. QUALITY SYSTEMS

Each organization shall establish and maintain a quality system that will:

1. Identify, implement and promote quality assurance policies and procedures that will produce data of a known and verifiable quality;

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- 2. Create and/or identify and follow standard operating procedures for all activities, both technical and administrative:
- 3. Monitor adherence to the established policies, procedures and written standard operating procedures;
- 4. Establish and use procedures for continual improvement through both corrective and preventive action policies; and
- 5. Monitor the quality of the organization's product.

## FA 3100. Quality Assurance Policies and Procedures

Each organization shall ensure that there are policies and procedures in place for the following activities:

#### 1. ORGANIZATION

- 1.1. Policies and procedures on how information concerning quality assurance issues are distributed and communicated.
- 1.2. Personnel procedures and documentation FDEP will review this type of information relative to the understanding and training of each individual for their assigned duties and quality assurance responsibilities. DEP will assess these items:
  - Hiring procedures and policies;
  - Position qualifications including education and experience requirements
  - Training requirements and training records
  - Position descriptions
  - Expectations on ethical behavior
  - Consequences of poor performance, unethical behavior or any activity that might misrepresent the quality of the organization's work.

## 2. REVIEW AND ASSESSMENT

- Procedures on how data are reviewed, evaluated and reported.
- 2.2. Policies concerning how non-standard or unacceptable results are handled.
- 2.3. Procedures describing how the entire quality system is monitored (audited) at the technical and managerial level.
- 2.4. Policies and procedures on how external audits are reviewed and used.
- 2.5. Policies and procedures on how the outcome of all audits are handled including initiating and monitoring both corrective and preventive actions.
  - 2.5.1. Identification of key personnel who are responsible for ensuring that the system is evaluated and for issuing audit reports and follow-up corrective/preventive action summaries.
  - 2.5.2. Identification of key personnel who review such reports and are in a position to make decisions about the effectiveness of the quality system.
- 2.6. Policies and procedures on how to deal with activities that did not follow the organization's procedures.

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2.7. Policies and procedures on how to document the use of procedures that are different from those in the FDEP SOPs or are new technology.

#### 3. CLIENT SERVICES

- 3.1. Policies and procedures that are used to review requests for services.
- 3.2. Policies and procedures relating to how customer concerns or complaints about any activity addressed in the FDEP SOPs are handled. This must include but is not limited to conducting audits and initiating corrective actions
- When applicable, policies and procedures to ensure and protect client confidentiality.
- 4. PROCUREMENT: These policies must reflect the specifications and requirements the FDEP SOPs as well as any additional considerations an organization might impose on how purchases are made.
  - 4.1. Policies and procedures describing how equipment, supplies and other services are obtained including:
    - 4.1.1. Specifications for equipment, containers, testing equipment, reagents and other supplies; and
    - 4.1.2. Specifications and procedures for obtaining laboratory services.

## FA 3200. Quality Assurance Responsibilities

Each individual in an organization has a responsibility for ensuring that their assigned tasks meet the organization's stated quality assurance goals, policies and procedures.

The following discussions assign certain tasks to various levels of responsibility. FDEP recognizes that the organization structure within a company may vary. With the exception of the QA Officer, the duties specified below may differ from suggested job titles and may be assigned to more than one person.

All tasks outlined below must be performed by an individual or individuals within the organization.

## FA 3210. QUALITY ASSURANCE OFFICER

The role of the Quality Assurance Officer (QAO) is one of oversight. In addition to coordinating and overseeing data quality activities, monitoring adherence to company policies and procedures and corrective actions, the QAO must have the ability and authority to recommend and implement immediate corrective measures, without going through chains of command. Therefore, organizational and functional position of QAO cannot be placed in direct lines of authority.

The Quality Assurance Officer must be able to objectively evaluate data and perform audits without outside influences. The responsibilities of the QAO may be divided among several individuals (i.e. corporate QAO, regional QA managers) and the designated QA Officer may be assigned other duties (e.g., project management). However, any other responsibilities cannot bias the performance of these tasks:

- 1. Reviews quality control data to determine if data are acceptable;
- 2. Performs annual systems audits to ensure compliance with all quality assurance plans and standard operating procedures;

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- 3. Distributes results of internal and external audits to management and all affected individuals;
  - Oversees responses to internal and external audits;
  - 3.2. Oversees and recommends corrective actions as a result of the audits;
  - 3.3. Verifies corrective action implementation.
- 4. Oversees administration of performance audits;
- 5. Coordinates preparation of quality assurance reports to management, clients and regulatory agencies;
- 6. Coordinates and oversees the preparation of quality manuals and quality assurance project plans;
- 7. Reviews new or proposed procedures to determine appropriate use. Also reviews associated method validation information;
- 8. Reviews, in writing, initiated corrective actions to assure effectiveness. Recommends additional measures if necessary.

## FA 3220. TECHNICIAN LEVEL

The field technician or sample collector must:

- 1. Perform field measurement tests according to FDEP SOPs including calibrations;
- 2. Verify that all calculations (e.g., purge volume) are correct;
- 3. Collect samples following the FDEP SOPs (or company SOPs) using appropriate equipment;
- 4. Ensure that sample containers are properly and accurately labeled;
- 5. Ensure that appropriate preservatives are added and that appropriate sample containers are used to collect required fractions;
- 6. Legibly and fully document all activities in field logs or field data sheets;
- 7. Ensure that all field information is accurately recorded;
- 8. Identify and/or document potential quality control problems (e.g., unacceptable calibrations, environmental conditions, procedure and equipment variances, etc.); and
- 9. Maintain equipment and test instruments in working condition, and document all preventative maintenance and repairs.
- 10. Implement any corrective action procedures that are a result of any type of audit.

## FA 3230. SUPERVISORS AND/OR SUBSECTION/SECTION MANAGEMENT

These individuals must:

- 1. Ensure that all activities (either sampling or field or laboratory testing) are performed according to methods and protocols specified in any quality planning document, sampling and analysis plan and the FDEP SOPs.
- 2. Review all field and laboratory generated data by:
  - 2.1. Checking documentation for completeness and proper sample identification;

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- 2.2. Checking raw data for calculation, interpretation or clerical errors
- 2.3. Assuring that produced quality control data are acceptable
- 3. Coordinate analytical work or field activities to assure that completion of all tasks within established time frames.
- 4. Oversee preventative maintenance activities.
- 5. Evaluate and implement changes in methodology and quality control measures.
- 6. Identify quality control problems and takes measures to correct or eliminate the problem source.
- 7. Monitor and/or implement any corrective action procedures that are a result of any audit type.
- 8. Assume the responsibility for validating all field generated documentation and data and ensure that final field reports are accurate before final review by management.

### FA 3240. PROJECT MANAGEMENT

- 1. Acts as a liaison between the client and the organization.
- 2. Oversees and coordinates project activities including workplans, quality assurance plans, data quality objectives, standard operating procedures and scheduling.
- 3. Ensures that there are adequate qualified personnel, equipment and time to produce a completed project of a specified quality.
- 4. Reviews project data prior to final report to assure that all data (field and laboratory) are acceptable and within specified project objectives.

#### FA 3250. MANAGEMENT

These individual(s) are responsible for overall operation of the organization including fiscal resources and personnel. They must:

- 1. Ensure that all organizational activities are conducted according the organization's established quality system, quality manual and standard operating procedures and that all policies and procedures are consistent with the quality manual.
- 2. Conduct management reviews at regularly scheduled intervals, not to exceed 12 months:
  - 2.1. The review and the procedures for such a review must be documented.
  - 2.2. The review must assess the organization's quality system, and related activities to determine the effectiveness of the system, and its continuing suitability. The review must include, but is not limited to:
    - Policy and procedures review
    - Outcome of internal and external audits
    - Corrective and preventative actions
    - Reports from managerial and supervisory staff
    - Changes in volume and type of work
    - Client feedback

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- Complaints and their resolution
- Staff training
- 2.3. The findings and recommendations of this management review must be documented, as well as any actions that are the result of the review.
- 3. Ensure that there is sufficient managerial, technical and support staff with the authority and resources (equipment, etc.) to perform their stated duties.
- 4. Establish procedures to ensure that all personnel are free from any undue internal or external commercial, financial and other pressures or influences that may adversely affect the performance and quality of their work.
- 5. Ensure that the staff has the necessary education, experience and/or training to perform their stated duties.

## FA 3300. Quality Manual

Each organization must have a quality manual that outlines their quality system, quality assurance policies and quality control procedures. All topics specified in FA 3100 and 3200 must be addressed by descriptive discussions or reference to specific policies and procedures.

At a minimum, the quality manual must address the following:

- 1. A title page signed by the quality assurance officer(s), and the highest level of management responsible for field activities with:
  - Document Title
  - Organization's full name, address and telephone number
  - Identification of all major organizational units covered by the document
  - The effective date of the version.
- 2. A table of Contents, and applicable lists of references, glossaries, appendices, tables and figures.
- 3. A statement of policy which must outline the organization's commitment to generating data through the use of sound Quality Assurance and Quality Control management practices.
- 4. An ethics statement which must outline (or make reference to) the organization's ethics policy and employee training on ethics.
- 5. ORGANIZATIONAL TOPICS:
  - 5.1. A discussion on the organizational structure, including lines of authority, identification of key personnel and their responsibilities, the relationship of all units (including administration, management and support services) to the quality system,
  - 5.2. Stated job descriptions for all staff or reference to such information
  - 5.3. A list of all approved signatories (e.g., Professional Geologist, Professional Engineer, Quality Assurance Officer).
  - 5.4. Discussion on or reference to procedures and policies dealing with employee credentials and training.
- 6. DOCUMENTATION

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- Discussion on or reference to procedures and policies concerning how records are 6.1. generated, retained and stored.
- Discussion on or reference to procedures dealing with how documentation is controlled and maintained.
- Discussion on or reference to the types of documents/reports that are generated by the organization.
- Discussion on or reference to procedures to ensure accurate sample identification and data integrity.
- Discussion on or reference to procedures to project client confidentiality (when 6.5. applicable).

## 7. CAPABILITIES

- Specify the organization's capabilities. This must include the types of sampling, sampling matrix and laboratory and field testing relevant to execution of the FDEP SOPs, and may include other services such as hydrology, engineering, etc.
- Reference to the specific sampling procedures to be used. 7.2.
- List all field and laboratory test methods 7.3.
- 7.4. List the types of field and laboratory instruments and equipment used by the organization for implementation of the FDEP SOPs.
- Reference to or discussion on how samples are handled and transported/submitted to a laboratory.

## 8. EQUIPMENT AND INSTRUMENTS

- Discussion on or reference to procedures used for calibrating instruments; source, preparation and documentation of standards; and procedures used to generate, assess and
- 8.2. Discussion on or reference to routine procedures used to maintain analytical instruments and sampling equipment and the associated documentation.

## 9. REVIEW AND ASSESSMENT

- Reference to or discussion on the types of quality control measures to be used. 9.1. Include:
  - 9.1.1. Types and frequency of field generated quality controls (blanks, replicates, etc.);
  - 9.1.2. Types and frequency of any ongoing quality control program to ensure the accuracy of laboratory data;
  - 9.1.3. The criteria against which each quality control measure will be assessed;
- Discussion on or reference to procedures to be used to review and assess raw data, 9.2. laboratory data and project data. At a minimum included:
  - 9.2.1. <u>Data reduction</u>: how raw data are reviewed and assessed (including criteria for accepting initial and continuing calibrations), and the formulas for calculating final
  - 9.2.2. <u>Data verification</u>: how data are assessed with respect to calculations (are the correct values reported?) and to quality control (were the systems in control according to

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- 9.2.3. <u>Data validation</u>: how project data are reviewed and assessed, including the content of any reports.
- 9.3. Discussion on or reference to the criteria for determining when corrective action must be initiated for each QC measure and the procedures used to implement corrective action.
- 9.4. Discussion on or reference to procedures to be used in the case of deviations from the documented policies and procedures
- 9.5. Discussion on or reference to the types of performance, systems and management audits to be performed including the frequency, the participants and the process.

### 10. CONSUMER RELATIONS

- 10.1. Discussion on or reference to policies and procedures regarding review of proposed work to ensure adequate personnel and equipment.
- 10.2. Discussion on or reference to policies and procedures for dealing with complaints.

## FA 4000. AUDITS AND DATA VALIDATION PROCEDURES

## FA 4100. Regulatory Requirements

All field and laboratory procedures conducted in accordance with the DEP SOPs or approved alternative procedures are subject to audits and data validation per the DEP Quality Assurance Rule, 62-160.650 & .660, F.A.C.

## FA 4200. Auditing Procedures

DEP audits affected parties for procedural compliance with the applicable sections of the collection of DEP SOPs. The subsections of FA 4200 outline the protocols employed by DEP in conducting these audits. Criteria by which parties are audited and evaluated are also listed according to general topic area and specifically associated DEP SOPs.

FA 4210. (RESERVED)

FA 4220. (RESERVED)

FA 4230. (RESERVED)

FA 4240. (RESERVED)

FA 4250. (RESERVED)

FA 4260. (RESERVED)

## FA 4270. AUDITING OF BIOLOGICAL COMMUNITY ASSESSMENT PROCEDURES

Auditing protocols in this section are applicable to biological procedures described in the following DEP SOP series:

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- FS 7000
- FT 3000
- LT 7000

## FA 4271. Auditing for Stream and River Habitat Benthic Macroinvertebrate Sampling

1. SCOPE AND APPLICABILITY

This auditing protocol is applicable to stream and river benthic macroinvertebrate sampling procedures described in FS 7410 and FS 7420.

- 1.1. Personnel performing the procedures in FS 7410, Rapid Bioassessment Method (Biorecon) and FS 7420, Stream Condition Index (SCI) Sampling for the purpose of determining biological indices as calculated per LT 7100, Biorecon Determination and LT 7200, Stream Condition Index (SCI) Determination must be audited by DEP according to the auditing protocol described in section 2 below and produce a satisfactory evaluation and score according to the audit and scoring criteria listed below in sections 3 & 4.
- 2. AUDITING PROTOCOL FOR STREAM AND RIVER BENTHIC MACROINVERTEBRATE SAMPLING
  - 2.1. General Auditing Protocols
    - 1.1.1. Audits are conducted in an appropriate physical field setting selected by DEP.
    - 1.1.2. Audit candidates are required to provide proper equipment in good working order necessary to conduct sampling.
    - 1.1.3. Audit candidates will be asked a series of questions designed to evaluate their conceptual knowledge of appropriate sampling methods.
    - 1.1.4. Audit candidates are expected to demonstrate satisfactory skill in performing the procedures detailed in the Biorecon and SCI sampling SOPs.
- 3. AUDITING EVALUATION CRITERIA FOR STREAM AND RIVER BENTHIC MACROINVERTEBRATE SAMPLING

Personnel must demonstrate a satisfactory working knowledge of and demonstrate the ability to perform the following:

- 3.1. Identify the best available habitats in a 100-meter stream reach (snags, leaf packs, roots, aquatic plants, limerock).
  - 3.1.1. Identification of best available habitat must include the following:
    - Length of inundation considered
    - Siltation and sedimentation effects considered
    - Leaf packs partially decayed
    - Flow considerations taken into account
- 3.2. Discuss and recognize circumstances where SCI or Biorecon sampling should be postponed, e.g., in the event of recent increase in water level or during flooding.
- 3.3. Know correct number of dipnet sweeps for SCI (20) and Biorecon (4).
- 3.4. Properly apportion dipnet sweeps to available habitats.

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- 3.5. Efficiently capture invertebrates during dipnet sweeps while properly agitating substrates with at least 3 passes of the dipnet over a 0.5 meter sample area (area sampled is 0.5 meters, plus or minus 0.1 m, absent consistently high or low bias).
- 3.6. Sample only productive portions of habitats while not diluting sample with unproductive detritus.
- 3.7. Properly transfer sampled material to sample container (SCI) or pick pan (Biorecon) without sample loss.

#### 3.8. Biorecon Sorting

- 3.8.1. Dispense proper density of detritus into pick pan for sorting efficiency.
- 3.8.2. Methodically search for organisms in pick pan.
- 3.8.3. Efficiently capture organisms using forceps and pipets.
- 3.8.4. Process entire dipnet contents.
- 3.8.5. Attain >95% picking efficiency (1 point; between 90% and 95% efficiency, 0.5 point; < 90%, no points, non-attainment).
- 4. AUDIT EVALUATION SCORING FOR BENTHIC MACROINVERTEBRATE SAMPLING

For mastery of each component in section 3 above, 1 point is awarded. Only 0.5 point is awarded if the applicable component is evaluated as partially correct. To pass, only 0.5 point can be missed (see section 3.8.5 above also).

## FA 4272. Auditing for Lake Condition Index (LCI) Sampling

1. SCOPE AND APPLICABILITY

This auditing protocol is applicable to Lake Composite Index (LCI) sampling procedures described in FS 7460.

- 1.1. Personnel performing the procedures in FS 7460, Lake Composite Index (LCI) Sampling for the purpose of determining the LCI (biological index), as calculated per LT 7300, LCI Determination must be audited by DEP according to the auditing protocol described in section 2 below and produce a satisfactory evaluation and score according to the audit and scoring criteria listed below in sections 3 & 4.
- 2. AUDITING PROTOCOL FOR LAKE CONDITION INDEX (LCI) SAMPLING
  - 2.1. General Auditing Protocols
    - 2.1.1. Audits are conducted in an appropriate physical field setting selected by DEP.
    - 2.1.2. Audit candidates are required to provide proper equipment in good working order necessary to conduct sampling.
    - 2.1.3. Audit candidates will be asked a series of questions designed to evaluate their conceptual knowledge of appropriate sampling methods.
    - 2.1.4. Audit candidates are expected to demonstrate satisfactory skill in performing the procedures detailed in the LCI sampling SOP.
- 3. AUDITING EVALUATION CRITERIA FOR LAKE CONDITION INDEX (LCI) SAMPLING Personnel must demonstrate a satisfactory working knowledge of and demonstrate the ability to perform the following:

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- 3.1. Appropriately subdivide lake into sampling units, using a map, GPS and landmarks (12 subunits in lakes less than 1000 acres, 2-4 subunits in larger systems).
- 3.2. Discuss and recognize circumstances where LCI sampling is not appropriate and should be replaced by wetlands sampling procedures, i.e., aquatic system with greater than 50% emergent macrophyte cover and depth less than 2 meters.
- 3.3. Follow correct sampling procedure using dredges:
  - 3.3.1. Deploy dredge from correct location on boat.
  - 3.3.2. Deploy and retrieve dredge to properly sample the benthos.
  - 3.3.3. Collect samples in the requisite sampling unit from the specified water depth (2 to 4 m).
  - 3.3.4. Repeat dredge deployment for each designated sampling unit.
- 3.4. Correctly process retrieved samples:
  - 3.4.1. Examine the sediment and document visual characteristics on the Composite Lake Sampling Sheet (Form FD 9000-2) or equivalent record.
  - 3.4.2. Check for sample loss from dredge before sieving sample.
  - 3.4.3. Properly sieve sample without losing portions of sample.
  - 3.4.4. Concentrate and transfer sample into collection container without loss.
- 3.5. Record appropriate location information for collected samples.
- 4. AUDIT EVALUATION SCORING FOR LAKE CONDITION INDEX (LCI) SAMPLING

For mastery of each component in section 3 above, 1 point is awarded. Only 0.5 point is awarded if the applicable component is evaluated as partially correct. To pass, only 0.5 point can be missed.

FA 4300. Data Validation (Reserved)

# FA 5000. FIELD PERSONNEL QUALIFICATIONS AND TRAINING

Certain procedures described in the DEP SOPs necessitate commensurate levels of expertise and proficiency for the user. Minimum qualifications, training and other requirements for personnel are described below for the indicated procedures.

FA 5100. (Reserved)

FA 5200. (Reserved)

FA 5300. (Reserved)

FA 5400. (Reserved)

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FA 5500. (Reserved)

FA 5600. (Reserved)

FA 5700. Qualifications and Training for Biological Procedures

## FA 5710. SAMPLING FOR BENTHIC MACROINVERTEBRATES

- 1. Training for Benthic Macroinvertebrate Sampling (Reserved)
- 2. Qualifications for Benthic Macroinvertebrate Sampling: Personnel performing macroinvertebrate sampling according to FS 7410, Rapid Bioassessment Method (Biorecon) and FS 7420, Stream Condition Index (SCI) Sampling for the purpose of determining biological indices as calculated per LT 7100, Biorecon Determination and LT 7200, Stream Condition Index (SCI) Determination or, according to FS 7460, Lake Composite Index (LCI) Sampling for the purpose of determining the LCI (biological index), as calculated per LT 7300, LCI Determination, must successfully complete an audit evaluation administered by DEP according to FA 4271, Auditing for Stream and River Habitat Benthic Macroinvertebrate Sampling or FA 4272, Auditing for Lake Condition Index (LCI) Sampling, as applicable.

## FA 6000. REFERENCES

- 1. Florida Department of Environmental Protection, <u>DEP Standard Operating Procedures for Laboratory Operations and Sample Collection Activities, DEP QA-001/92</u>, September 1992.
- 2. U.S. Environmental Protection Agency, Region 4; Environmental Investigations Standard Operating Procedures and Quality Assurance Manual, May 1996.
- 3. U.S. Environmental Protection Agency, <u>National Environmental Laboratory Accreditation</u> Conference Constitution, Bylaws and Standards, EPA600/R-99/-68, July 1999.
- 4. Florida Department of Environmental Protection, <u>DEP Manual for Preparing Quality Assurance Plans</u>, <u>DEP QA001/90</u>, September 1992.
- 5. Florida Department of Environmental Protection, <u>Chapter 62-160, F.A.C., Quality Assurance</u>, Effective date, September 2001.

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## Appendix FA 1000 Tables, Figures and Forms

Table FA 1000-1 Sample Collection Matrices

Table FA 1000-2 Aqueous Sample Collection Analyte Groups
Table FA 1000-3 Non-Aqueous Sample Collection Analyte Groups

Glossary

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## Table FA 1000-1 Sample Collection Matrices

NOTE: Matrix terms are organized on the basis of differentiation of sample collection technique and sample source, not analytical matrix.

## 1. AQUEOUS ENVIRONMENTAL MATRICES

Potable water

Groundwater

Surface water

Rainwater

Soil interstitial (pore) water

Sediment interstitial (pore) water

Stormwater

#### 2. AQUEOUS WASTE MATRICES

Aqueous chemical waste

Aqueous leachate

Aqueous industrial sludge

Aqueous domestic wastewater sludge

Industrial wastewater

Domestic wastewater

## 3. NON-AQUEOUS ENVIRONMENTAL MATRICES

Soil

Sediment

### 4. NON-AQUEOUS WASTE MATRICES

Non-aqueous liquid industrial sludge

Non-aqueous liquid chemical waste

Mixed-media liquid industrial sludge

Mixed-media liquid chemical waste

Solid industrial waste

Solid chemical waste

Solid domestic waste

Construction & demolition debris

Refuse-derived fuel

Domestic wastewater sludge cake

Industrial sludge cake

Compost

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## Table FA 1000-1 **Sample Collection Matrices**

Screened material

5. BIOLOGICAL TISSUE MATRICES

Finfish

Shellfish

Mammals

Birds

Reptiles

Other animals

Plants

6. AIR MATRICES

Remedial treatment system exhaust

Soil vapor

7. SUBSTRATES

Contaminated surfaces

Natural biological community substrates

Artificial biological community substrates

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## Table FA 1000-2 **Aqueous Sample Collection Analyte Groups**

NOTE: Examples are given for most of the analyte groups listed below, but the lists are not comprehensive. The analyte groups are organized according to the following criteria as they apply to sample collection only: 1) uniqueness of the group name to signify common sample collection technique and compatible sampling equipment materials; 2) familiarity of group name and conventional usage; 3) special sampling technique associated with the group name; and 4) brevity in the interest of avoiding a longer list.

- 1. VOLATILE ORGANICS: Volatile organic aromatics, volatile organic halocarbons, EDB
- 2. EXTRACTABLE ORGANICS: Base/neutral/acid individual, synthetic organics typically analyzed by GC, GCMS and HPLC (e.g., phenols, PCBs, PAHs, pesticides, herbicides, dioxins, etc.)
- 3. PETROLEUM HYDROCARBONS AND OIL & GREASE: Samples collected for all Oil & Grease, TRPH and FL-PRO analyses
- 4. RADIONUCLIDES: Total Alpha and Beta emitters, but not Radon
- 5. BIOLOGICALS: Aquatic toxicity tests (biotoxicity/whole effluent toxicity), algal growth potential, phytoplankton and chlorophyli
- 6. METALS
- 7. ULTRA-TRACE METALS: Metals collected by "clean-hands" sampling techniques for sub-ppb
- 8. INORGANIC NON-METALLICS: Nutrients and other inorganic anions, residual chlorine, dissolved oxygen, neutral-charge chemical species
- 9. AGGREGATE ORGANICS: TOX, BOD, COD, TOC, total phenols and surfactants
- 10. MICROBIOLOGICAL-BACTERIA: Fecal and total coliforms, enterococcus and fecal strep
- 11. MICROBIOLOGICAL-PROTOZOA: Giardia, cryptosporidium and microscopic particulate analysis (MPA)
- 12. MICROBIOLOGICAL-VIRUSES
- 13. VOLATILE INORGANICS: Sulfide, hydrogen sulfide, sulfite
- 14. PHYSICAL AND AGGREGATE PROPERTIES: Color, conductivity, hardness, alkalinity, odor, residues (solids), turbidity, salinity, asbestos, SOUR test, acidity, hazardous waste characteristics

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## Table FA 1000-3 Non-Aqueous Sample Collection Analyte Groups

NOTE: This list is applicable to liquid, solid and mixed-phase non-aqueous matrices. Examples are given for most of the analyte groups listed below, but the lists are not comprehensive. The analyte groups are organized according to the following criteria, as they apply to sample collection only: 1) uniqueness of the group name to signify common sample collection technique and compatible sampling equipment materials; 2) familiarity of group name and conventional usage; 3) special sampling technique associated with the group name; and, 4) brevity in the interest of avoiding a longer list

- 1. VOLATILE ORGANICS: Volatile organic aromatics, volatile organic halocarbons, EDB
- 2. EXTRACTABLE ORGANICS: Base/neutral/acid individual, synthetic organics typically analyzed by GC, GCMS and HPLC, e.g., phenols, PCBs, PAHs, pesticides, herbicides, dioxins, etc.
- 3. PETROLEUM HYDROCARBONS AND OIL & GREASE: Samples collected for all Oil & Grease, TRPH and FL-PRO analyses
- 4. RADIONUCLIDES: Total Alpha and Beta emitters, but not Radon
- 5. BIOLOGICALS: Benthic macroinvertebrates and periphyton from natural and artificial substrates, toxicity studies conducted in non-aqueous media
- 6. METALS
- 7. INORGANIC NON-METALLICS: Nutrients and inorganic anions, neutral-charge chemical species
- 8. AGGREGATE ORGANICS: TOX, SOD, COD, TOC, total phenois
- 9. MICROBIOLOGICAL-BACTERIA: Fecal and total coliforms, enterococcus and fecal strep
- 10. MICROBIOLOGICAL-VIRUSES
- 11. VOLATILE INORGANICS: Sulfide, hydrogen sulfide
- 12. PHYSICAL AND AGGREGATE PROPERTIES: Residues (solids), SOUR test, hazardous waste characteristics, particle size, etc.

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### Glossary

Acceptance criteria The numerical limits, prescribed by an approved analytical method,

internal data or other preestablished data quality objectives, by which an analytical system or analysis result is verified. Also known as control limits. Acceptance criteria are usually established for

calibration, precision, sensitivity and accuracy.

Accuracy The degree of agreement of a measurement (or an average of

measurements of the same thing), X, with an accepted reference or true value, T, usually expressed as the difference between the two values, X-T, or the difference as a percentage of the reference or true value, 100 (X-T)/T, and sometimes expressed as a ratio, X/T.

Accuracy is a measure of the bias in a system.

Analyte Any measured quantity reported in final units of concentration.

Analyte group A categorical grouping of analytes based on shared sample

collection procedure and equipment construction restrictions. See

Tables FA 1000-1 and FA 1000-2.

Analyte-free water Water free of all positive or negative analytical interferences in which

all analytes of interest are below method detection limits.

Audit A systematic check to determine the quality of the operation of a

function, procedure or activity.

Best management

Procedures designed to mitigate against adverse environmental practices (BMPs)

consequences associated with human activities.

Bioaccumulation The accumulation of contaminants in the tissue of organisms through

any route, including respiration, ingestion, or direct contact with contaminated water, sediment, pore water, or dredged material.

Bioconcentration A process by which there occurs a net accumulation of a chemical

directly from water into aquatic organisms resulting from

simultaneous uptake (e.g., by gill or epithelial tissue) and elimination.

Biological tissue Includes tissues of plant or animal origin. The most common of

these are shellfish, finfish and aquatic plants.

Biomagnification Result of the process of bioconcentration and bioaccumulation by

which tissue concentrations of bioaccumulated chemicals increase as the chemical passes upwards through two or more trophic levels. The term implies an efficient transfer of chemical from food to

consumer, so that residue concentrations increase systematically

from one trophic level to the next.

Blank An artificial quality control sample of an analytical matrix designed to

monitor the introduction of artifacts and interferences into a sample

collection or analytical system.

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#### Glossary

Blind sample A quality control sample of known composition whose analytical

characteristics are unknown to an audited analyst or organization.

Calibration The process by which the correlation between instrument response

and actual value of a measured analyte or parameter is determined.

Calibration curve A curve that plots the concentration of known analyte standards

against the instrument response to the analyte. Also known as a

standard curve.

Calibration standard Solutions or purified quantities of a substance or material with a

verifiable composition that are used to measure the amount or value of an analyte or parameter in an unknown sample. Calibration standards are used to establish a calibration curve or instrument

response factor.

Chemical waste Liquid or solid chemicals that are no longer industrially useful.

Comparability Expresses the statistical confidence with which one data set can be

compared to another.

Confidence level The statistical probability associated with an interval of variance.

Usually expressed as percent probability. The result being tested is significant if the calculated probability is greater than 90 percent and

is highly significant if the probability is greater than 99 percent.

Continuing calibration

standard

A standard analyzed during a measurement process to verify the accuracy of a calibration curve or other instrument calibration.

Creel census An assessment of the fish consumption by human populations based

on a statistical survey of fish landings by sport and subsistence

catches.

Data quality The features and characteristics of a set of data that determine its

suitability for a given purpose. Examples of data quality include

accuracy, precision, sensitivity, representativeness and

comparability.

Data quality

objectives

A set of specifications established for an intended use of a set of data.

Data validation An audit in which data are evaluated according to predetermined

validation criteria established as data quality objectives.

**Detection limit** The smallest amount of an analyte that can be measured with a

stated probability of significance.

**D-frame dipnet** Pole with a No.30 mesh bag attached to a "D-shaped" frame used for

the collection of aquatic invertebrates.

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#### Glossary

Drinking water Includes finished (treated) or raw source water designated as potable

water. Drinking water sources may originate from surface or ground

water.

Environmental sample Any sample from a natural or other source that may reasonably be

expected to contribute pollution to or receive pollution from ground

waters or surface waters of the state. [Definition per Rule

10D-41.101(7), F.A.C.]

Equipment blank Quality control blanks prepared on-site during sampling by pouring

analyte-free water through decontaminated field equipment into appropriate sample containers for each matrix and analyte group of interest. Equipment blanks are chemically preserved, stored, transported and analyzed with the collected field samples.

**External** Refers to operations, personnel, documents and protocols from a

party that is separate from or outside the specified organization.

Field blanks Quality control blanks prepared on-site during sampling by pouring

analyte-free water into appropriate sample containers for each analyte group of interest. Field blanks are chemically preserved, stored, transported and analyzed with the collected field samples.

Field spike An environmental sample fortified to a known and validated

concentration in the field during sampling. These quality control samples are sometimes submitted as blind samples to the analyzing

laboratory.

Frotus A double rake-head with a line attached and used for collecting

submerged aquatic vegetation.

Groundwater Includes all waters found below ground in confined or unconfined

aquifers.

Hester-Dendy artificial

substrate (HD)

Artificial substrate of known surface area used for the collection of

invertebrates over a known amount of time.

Hydrophobic A hydrophobic or lipophilic chemical having low water solubility and

correspondingly high solubility in lipids or nonpolar solvents.

Instrument detection

limit

The smallest amount of an analyte of interest that generates an instrument response (signal) under prescribed conditions such that

the magnitude of the signal is larger than the absolute uncertainty

(error) associated with the signal.

Intensive study A study of the temporal and spatial variability of specific

contaminants found in the tissues of aquatic organisms living in a

body of water impacted by pollution.

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#### Glossary

Interference Any substance in a sample that may fortify or diminish the amount of

an analyte or otherwise affect the ability to detect and quantify an

analyte in the sample.

Internal Refers to operations, personnel, documents and protocols within the

specified organization.

Internal standard A compound having similar chemical characteristics to the

> compounds of interest but which is not normally found in the environment or does not interfere with the compounds of interest. A known and specified concentration of the standard is added to each sample prior to analyses. The concentration in the sample is based

on the response of the internal standard relative to that of the calibration standard and the compound in the standard.

Legal or evidentiary chain of custody

A sample custody protocol in which all personnel, time intervals and supporting activities associated with the collection, possession, handling, processing, analysis, transport, storage and disposal of a

specific sample are documented.

Method blank A blank of an appropriate analyte-free matrix that is processed

(digested, extracted, etc.) and analyzed with a specified sample set.

Method detection limit The smallest amount of an analyte that can be analyzed by a given

measurement system under specified conditions of sample

processing and analysis and reported with a 99% confidence that the

concentration of the analyte in the sample is greater than zero.

**Parameter** For the purposes of the FDEP SOPs, any measured quantity not

reported in units of concentration.

Parent sample A sample from which aliquots or subsamples are taken for

processing or testing purposes.

Performance audit An audit where quantitative data are independently obtained for

> comparison with routinely obtained data in a measurement system. Examples of these audits are EPA performance evaluation programs,

commercial performance evaluation programs, split sampling programs involving at least two laboratories and/or sampling

organizations and blind samples.

Performance

A sample submitted for analysis whose composition and evaluation samples

concentration are known to the submittor but unknown to the analyst.

Also known as a blind sample.

Periphytometer Artificial substrate of known surface area used for collection of algae

(specifically periphyton) over a known amount of time.

Aquatic algae attached to natural or artificial substrates. Periphyton

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### Glossary

Practical quantitation

limit

The smallest concentration of an analyte that can be reported with an associated precision. FDEP defines a practical quantitation limit as:

 $PQL = 4 \times MDL$ 

Precision

A measure of mutual agreement among individual measurements of a parameter or an analyte, usually under prescribed similar conditions. Precision is best expressed in terms of the standard deviation. Various measures of precision are used depending upon

the "prescribed similar conditions".

Project audit

An independent review of all sampling and analytical documentation associated with a specific project or event in order to determine if the resulting data are valid and acceptable according to preestablished validation criteria and other data quality objectives. Enough documentation must be available so that a reviewer is able to reconstruct the history of a sample from time of sample collection (or sample container acquisition) through final results and sample

disposal.

Quality assurance

The system of management activities and quality control procedures implemented to produce and evaluate data according to

preestablished data quality objectives.

Quality assurance plans

An orderly assembly of detailed and specific procedures that delineates how data of known and accepted quality are produced.

Quality assurance project plans

A QA plan written for a specific project outlining data quality objectives, sampling and analytical protocols and QC measures needed to satisfy the intended uses of the data.

Quality control

The system of measurement activities used to document and control the quality of data so that it meets the needs of data users as specified by preestablished data quality objectives.

Quality control check sample

A sample obtained from an independent source for which the level of an analyte has been validated or certified. Also known as a reference material. The sample is prepared and analyzed with a sample set of similar matrix. If the sample has been obtained from the National Institute of Standards and Technology, it is referred to as a Standard Reference Material.

Quality control check standards

Certified and traceable standard solutions or purified materials from a source other than routine calibration standards used to check the accuracy of a calibration.

Quality control checks

Standards or known samples from an independent source that are analyzed at a specified frequency.

Reagent blank

An aliquot of analyte-free water or solvent that is analyzed with a sample set.

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### Glossary

Reagent spike

Samples of an appropriate analyte-free matrix (deionized water, sand, soil, etc.) that are fortified to a known and validated concentration of analyte(s) before sample preparation and subsequent analysis.

Reagent water

A sample of water that conforms to ASTM grades II, III or IV.

Replicate sample

Samples that have been collected at the same time from the same source (field replicates) or aliquots of the same sample that are prepared and analyzed at the same time (laboratory replicates). Duplicate samples are one type of replicate sample. The analytical results from replicates are used to determine the precision of a system. If the concentration of analytes in the sample are below detectable limits, duplicate spike samples may be used to determine precision. Blind replicates (or duplicates) are replicates that have been collected (field replicates) or prepared (laboratory replicates) and are analyzed as separate samples whose replicate nature remains unknown to the analyst or organization.

Representativeness

Expresses the degree to which data for a sampled source accurately and precisely represent a characteristic or variation of the sampled source in terms of a measured analyte or parameter.

Research quality assurance plan

A quality assurance project plan written for research activities where non-standard procedures are used.

Riparian buffer zone

Land directly adjacent to a water body.

Sample custody

All records and documentation that trace sample possession, handling and associated supporting activities from the point of sample collection through transport, storage, processing, analysis and disposal of the sample.

Sample matrix

The natural or artificial medium from which a sample is collected. For the purposes of the FDEP SOPs, a matrix is categorized in terms of the sample source and associated collection technique. See Table FA 1000-1.

Sample matrix spike

An environmental sample fortified to a known and validated concentration of analyte(s) before sample preparation and subsequent analysis.

Sampling Kit

A set of sampling accessories that has been assembled for a specified use or project. Examples of sampling accessories include: sample containers, sampling equipment, chemical preservatives, trip blanks, reagent transfer implements (e.g., disposable pipets), calibration standards, indicator papers (e.g., pH paper), reagents, etc.

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### Glossary

Screening study

A study where a body of water is being surveyed for the presence of contaminants in the tissues of aquatic organisms without prior

knowledge of their presence.

Secchi disk

A large round disk with an alternating black and white pattern used to determine visibility in lakes. The disk is lowered into the water column until the observer can no longer see the pattern.

Sediment

The unconsolidated solid matrix occurring immediately beneath any surface water body. The surface water body may be present part or all of the time.

Spiked samples

Any samples fortified with a known and validated concentration of analyte.

Split samples

Replicates of the same sample that are given to two independent laboratories for analysis.

Stream order

A method of classifying stream channels in a watershed. DEP uses Strahler's system where the uppermost channels (headwater streams with no tributaries) are considered first-order streams. The confluence of two first-order streams creates a second-order. Third-order streams start at the confluence of two second-order streams.

Subsample

Refers to any derivative obtained from a sample. Examples of subsamples include: aliquots, filtrates, digestates, eluates, fractions, extracts, reaction products, supernatants, etc.

Surface water

Includes fresh or saline waters from water bodies such as streams, canals, rivers, lakes, ponds, bays and estuaries (natural or manmade).

Surrogate spikes

Samples fortified with a compound having similar chemical characteristics to the analytes of interest, but which is not normally found in environmental samples. Known concentrations of these compounds are added to all samples in the set before sample preparation and subsequent analysis.

System audit

A qualitative on-site review and evaluation of a laboratory or field operation quality assurance system and physical facilities utilized for sampling, sample processing, calibration and measurement or analysis.

Trip blank

Trip blanks are only used for VOC samples. Blanks of VOC-free water are prepared by the organization providing sample containers for VOC collection. These blanks are transported to the site with the empty VOC sample containers and shipped to the analyzing laboratory in the same transport containers as the VOC samples. They remain unopened for the entire trip and are analyzed at the laboratory with the environmental VOC samples.

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## Glossary

Trophic level The different feeding relationships in an ecosystem that determine

the route of energy flow and the pattern of chemical cycling.

U.S. No. 30 mesh Standard U.S. 30 sieve size.

Van Dorn bottle A water quality sampling device which allows for discrete water

samples to be taken at various depths.

Vascular plant A plant of higher order containing conducting tissues consisting

primarily of xylem and phloem. These tissues are also known as

vascular tissues.

Wastewater Includes any influent or effluent associated with domestic or industrial

waste treatment facilities.

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## BROWNFIELDS ASSESSMENT. OCALA, FLORIDA FOIA 2019-003937

FOLDER NUMBER	BRIEF DESCRIPTION	
424-157	APPEN1-2	

# APPENDIX I-2 FC 1000 - CLEANING PROCEDURES

## FC 1000. CLEANING / DECONTRAVITINAVITION PROCEDURES

#### 1. PERFORMANCE CRITERIA

- 1.1. The cleaning/decontamination procedures must ensure that all equipment that contacts a sample during sample collection are free from the analytes of interest and constituents that would interfere with the analytes of interest.
- 1.2. The detergents and other cleaning supplies cannot contribute analytes of interest or interfering constituents unless these are effectively removed during a subsequent step in the cleaning procedure.
- 1.3. The result of any cleaning procedure (including all cleaning reagents) must be equipment blanks with reported non-detected values.

The cleaning procedures outlined in this SOP are designed to meet the above-mentioned performance criteria. Alternative cleaning reagents or procedures may be used. However, the organization must be prepared to demonstrate through documentation (i.e., company-written protocols and analytical records) and historical data (i.e., absence of analytes of interest in equipment blanks) that it consistently meets these performance criteria. Field quality control measures (see FQ 1210) must support the use of alternative reagents or procedures.

### FC 1001. Cleaning Reagents

Recommendations for the types and grades of various cleaning supplies are outlined below. The recommended reagent types or grades were selected to ensure that the cleaned equipment is free from any detectable contamination.

1. DETERGENTS: Use Liqui-Nox (or a non-phosphate equivalent) or Alconox (or equivalent). Liqui-Nox (or equivalent) is recommended by EPA, although Alconox (or equivalent) may be substituted if the sampling equipment will not be used to collect phosphorus or phosphorus-containing compounds.

#### 2. SOLVENTS

- 2.1. Use pesticide grade isopropanol as the rinse solvent in routine equipment cleaning procedures. This grade of alcohol must be purchased from a laboratory supply vendor. Rubbing alcohol or other commonly available sources of isopropanol <u>are not acceptable</u>.
- 2.2. Other solvents, such as acetone or methanol, may be used as the final rinse solvent if they are pesticide grade. However, methanol is more toxic to the environment and acetone may be an analyte of interest for volatile organics.
  - 2.2.1. **Do not use** acetone if volatile organics are of interest.
  - 2.2.2. Containerize all methanol wastes (including rinses) and dispose as a hazardous waste.
- 2.3. Preclean equipment that is heavily contaminated (see FC 1120, section 3) with organic analytes with reagent grade acetone and hexane or other suitable solvents.
- 2.4. Use pesticide grade methylene chloride when cleaning sample containers.
- 2.5. Store all solvents away from potential sources of contamination (gas, copier supplies, etc.).

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## FC 1000 Cleaning / Decontamination Procedures

### 3. ANALYTE-FREE WATER SOURCES

- Analyte-free water is water in which all analytes of interest and all interferences are below method detection limits.
- 3.2. Maintain documentation (such as results from equipment blanks) to demonstrate the reliability and purity of analyte-free water source(s).
- 3.3. The source of the water must meet the requirements of the analytical method and must be free from the analytes of interest. In general, the following water types are associated with specific analyte groups:
  - Milli-Q (or equivalent polished water): suitable for all analyses.
  - Organic-free: suitable for volatile and extractable organics.
  - Deionized water: may not be suitable for volatile and extractable organics.
  - Distilled water: not suitable for volatile and extractable organics, metals or ultratrace metals.
- 3.4. Use analyte-free water for blank preparation and the final decontamination water rinse.
- 3.5. In order to minimize long-term storage and potential leaching problems, obtain or purchase analyte-free water just prior to the sampling event. If obtained from a source (such as a laboratory), fill the transport containers and use the contents for a single sampling event. Empty the transport container(s) at the end of the sampling event.
- 3.6. Discard any analyte-free water that is transferred to a dispensing container (such as a wash bottle) at the end of each sampling day.

#### 4. ACIDS

- 4.1. <u>Reagent Grade Nitric Acid</u>: 10 15% (one volume concentrated nitric acid and five volumes deionized water).
  - 4.1.1. Use for the acid rinse unless nitrogen components (e.g., nitrate, nitrite, etc.) are to be sampled.
  - 4.1.2. If sampling for ultra-trace levels of metals, use an ultra-pure grade acid.
- 4.2. Reagent Grade Hydrochloric Acid: 10% hydrochloric acid (one volume concentrated hydrochloric and three volumes deionized water).
  - 4.2.1. Use when nitrogen components are to be sampled.
- 4.3. If samples for both metals and the nitrogen-containing components (see FC 1001, section 4.1.1 above) are collected with the equipment, use the hydrochloric acid rinse, or thoroughly rinse with hydrochloric acid after a nitric acid rinse.
- 4.4. If sampling for ultra trace levels of metals, use an ultra-pure grade acid.
- 4.5. Freshly prepared acid solutions may be recycled during the sampling event or cleaning process. Dispose appropriately at the end of the sampling event, cleaning process or if acid is discolored or appears otherwise contaminated (e.g., floating particulates).
  - 4.5.1. Transport only the quantity necessary to complete the sampling event.
- Dispose of any unused acids according to FDEP and local ordinances.

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#### FC 1002. Reagent Storage Containers

The contents of all containers must be clearly marked.

1. DETERGENTS: Store in the original container or in a high density polyethylene (HDPE) or polypropylene (PP) container.

#### 2. SOLVENTS

- 2.1. Store solvents to be used for cleaning or decontamination in the original container until use in the field. If transferred to another container for field use, the container must be either glass or Teflon.
- 2.2. Use dispensing containers constructed of glass, Teflon or stainless steel. Note: if stainless steel sprayers are used, any gaskets that contact the solvents must be constructed of inert materials.
- 3. ANALYTE-FREE WATER: Transport in containers appropriate to the type of water to be stored. If the water is commercially purchased (e.g., grocery store), use the original containers when transporting the water to the field. Containers made of glass, Teflon, polypropylene, or HDPE are acceptable.
  - 3.1. Use glass or Teflon to transport organic-free sources of water on-site. Polypropylene or HDPE may be used but are not recommended.
  - 3.2. Dispense water from containers made of glass, Teflon, HDPE or polypropylene.
  - 3.3. Do not store water in transport containers for more than three days before beginning a sampling event.
  - 3.4. If working on a project that has oversight from EPA Region 4, use glass containers for the transport and storage of all water.
  - 3.5. Store and dispense acids using containers made of glass, Teflon or plastic.

#### FC 1003. General Requirements

- 1. Before using any equipment, clean/decontaminate all sampling equipment (pumps, tubing, lanyards, split spoons, etc.) that are exposed to the sample.
  - 1.1. Before installing, clean (or obtain as certified precleaned) all equipment that is dedicated to a single sampling point and remains in contact with the sample medium (e.g., permanently installed groundwater pump (see FS2220, section 3.3.4).
  - 1.2. Clean this equipment any time it is removed for maintenance or repair.
  - 1.3. Replace dedicated tubing if discolored or damaged.
- 2. Clean all equipment in a designated area having a controlled environment (house, laboratory, or base of field operations) and transport to the field precleaned and ready to use, unless otherwise justified.
- 3. Rinse all equipment with water after use, even if it is to be field-cleaned for other sites. Rinse equipment used at contaminated sites or used to collect in-process (e.g., untreated or partially treated wastewater) samples immediately with water.
- 4. Whenever possible, transport sufficient clean equipment to the field so that an entire sampling event can be conducted without the need for cleaning equipment in the field.

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- 5. Segregate equipment that is only used once (i.e., not cleaned in the field) from clean equipment and return to the in-house cleaning facility to be cleaned in a controlled environment.
- 6. Protect decontaminated field equipment from environmental contamination by securely wrapping and sealing with one of the following:
  - 6.1. Aluminum foil (commercial grade is acceptable);
  - 6.2. Untreated butcher paper; or
  - 6.3. Clean, untreated, disposable plastic bags. Plastic bags may be used:
    - 6.3.1. For all analyte groups except volatile and extractable organics;
    - 6.3.2. For volatile and extractable organics if the equipment is first wrapped in foil or butcher paper or if the equipment is completely dry.

## FC 1100. Cleaning Sample Collection Equipment

#### FC 1110. ON-SITE/IN-FIELD CLEANING

- 1. Cleaning equipment on-site is not recommended because:
  - 1.1. Environmental conditions cannot be controlled.
  - 1.2. Wastes (solvents and acids) must be containerized for proper disposal.
- 2. If performed, follow the appropriate cleaning procedure as outlined in FC 1130. Ambient temperature water may be substituted in the hot, sudsy water bath, and hot water rinses.

#### Note: Properly dispose of all solvents and acids.

3. Rinse all equipment with water after use, even if it is to be field-cleaned for other sites. Rinse equipment used at contaminated sites or used to collect in-process (e.g., untreated or partially treated wastewater) samples immediately with water.

#### FC 1120. HEAVILY CONTAMINATED EQUIPMENT

In order to avoid contaminating other samples, isolate heavily contaminated equipment from other equipment and thoroughly decontaminate the equipment before further use. Equipment is considered heavily contaminated if it:

- Has been used to collect samples from a source known to contain significantly higher levels than background;
- · Has been used to collect free product; or
- Has been used to collect industrial products (e.g., pesticides or solvents) or their byproducts.
- 1. Cleaning heavily contaminated equipment in the field is not recommended.
- 2. ON-SITE PROCEDURES
  - 2.1. Protect all other equipment, personnel and samples from exposure by isolating the equipment immediately after use.
  - 2.2. At a minimum, place the equipment in a tightly sealed untreated plastic bag.

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- 2.3. Do not store or ship the contaminated equipment next to clean, decontaminated equipment, unused sample containers, or filled sample containers.
- 2.4. Transport the equipment back to the base of operations for thorough decontamination.
- 2.5. If cleaning must occur in the field, and in order to document the effectiveness of the procedure, collect and analyze blanks on the cleaned equipment (see FQ 1000).

#### 3. CLEANING PROCEDURES

- 3.1. If organic contamination cannot be readily removed with scrubbing and a detergent solution, prerinse equipment by thoroughly rinsing or soaking the equipment in acetone.
  - 3.1.1. Use hexane only if preceded and followed by acetone.
- 3.2. In extreme cases, it may be necessary to steam clean the field equipment before proceeding with routine cleaning procedures.
- 3.3. After the solvent rinses (and/or steam cleaning), use the appropriate cleaning procedure (see FC 1130).
  - 3.3.1. Scrub, rather than soak all equipment with sudsy water.
  - 3.3.2. If high levels of metals are suspected and the equipment cannot be cleaned without acid rinsing, soak the equipment in the appropriate acid. Since stainless steel equipment should not be exposed to acid rinses, do not use stainless steel equipment when heavy metal contamination is suspected or present.
- 3.4. If the field equipment cannot be cleaned utilizing these procedures, discard unless further cleaning with stronger solvents and/or oxidizing solutions is effective as evidenced by visual observation and blanks.
- 3.5. Clearly mark or disable all discarded equipment to discourage use.

#### FC 1130. GENERAL CLEANING

Follow these procedures when cleaning equipment under controlled conditions. See FC 1110 for modifications if cleaning is performed on-site. Check manufacturer's instructions for cleaning restrictions and/or recommendations.

## FC 1131. Procedure for Teflon, Stainless Steel and Glass Sampling Equipment

This procedure must be used when sampling for **ALL** analyte groups: extractable organics, metals, nutrients, etc. or if a single decontamination protocol is desired to clean all Teflon, stainless steel and glass equipment.

- Rinse equipment with hot tap water.
- 2. Soak equipment in a hot, sudsy water solution (Liqui-Nox or equivalent see FC 1001, section 1).
- 3. If necessary, use a brush to remove particulate matter or surface film.
- 4. Rinse thoroughly with hot tap water.
- 5. If samples for trace metals or inorganic analytes will be collected with the equipment and the equipment <u>is not</u> stainless steel, thoroughly rinse (wet all surfaces) with the appropriate acid solution (see FC 1001, section 4).

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- 6. Rinse thoroughly with analyte-free water. Use enough water to ensure that all equipment surfaces are thoroughly flushed with water.
- 7. If samples for volatile or extractable organics will be collected, rinse with isopropanol. Wet equipment surfaces thoroughly with free-flowing solvent. Rinse thoroughly with analyte-free water (see FC 1001, section 3).
- 8. Allow to air dry. Wrap and seal according to FC 1003, section 6 as soon as the equipment is air-dried.
- 9. If isopropanol is used, the equipment may be air-dried without the final analyte-free water rinse (see FC 1131, section 8 above); however, the equipment must be completely dry before wrapping or use.
- 10. Wrap clean sampling equipment according to the procedure described in FC 1003, section 6.

## FC 1132. General Cleaning Procedure for Plastic Sampling Equipment

- 1. Rinse equipment with hot tap water.
- 2. Soak equipment in a hot, sudsy water solution (Liqui-Nox or equivalent see FC 1001, section 1).
- 3. If necessary, use a brush to remove particulate matter or surface film.
- 4. Rinse thoroughly with hot tap water.
- 5. Thoroughly rinse (wet all surfaces) with the appropriate acid solution (see FC 1001, section
- 4). Check manufacturer's instructions for cleaning restrictions and/or recommendations.
- 6. Rinse thoroughly with analyte-free water. Use enough water to ensure that all equipment surfaces are thoroughly flushed with water. Allow to air dry as long as possible.
- 7. Wrap clean sampling equipment according to the procedure described in FC 1003, section6.

## FC 1133. Cleaning Procedure by Analyte Group

See Table FC 1000-1 for the procedures to be used to decontaminate equipment based on construction of sampling equipment, and analyte groups to be sampled.

## FC 1140. AUTOMATIC SAMPLERS, SAMPLING TRAINS AND BOTTLES

- 1. When automatic samplers are deployed for extended time periods, clean the sampler using the following procedures when routine maintenance is performed. Inspect deployed samplers prior to each use. At a minimum, change the tubing if it has become discolored or has lost elasticity (FC 1140, section 2.3 below).
- 2. Clean all automatic samplers (such as ISCO) as follows:
  - 2.1. Wash the exterior and accessible interior portions of the automatic samplers (excluding the waterproof timing mechanisms) with laboratory detergent (see FC 1001, section 1) and rinse with tap water.
  - 2.2. Clean the face of the timing case mechanisms with a clean, damp cloth.

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- 2.3. Check all tubing (sample intake and pump tubing). Change the tubing every six months (if used frequently) or if it has become discolored (i.e., affected by mold and algae) or if it has lost its elasticity.
- 2.4. See FC 1160, section 4 for the procedures associated with cleaning the tubing in the pump head.
- 3. AUTOMATIC SAMPLER ROTARY FUNNEL AND DISTRIBUTOR
  - 3.1. Clean with hot sudsy water and a brush (see FC 1001, section 1 for appropriate detergent type).
  - 3.2. Rinse thoroughly with analyte-free water.
  - 3.3. Air dry.
  - 3.4. Replace in sampler.
- 4. SAMPLER METAL TUBE: Clean as outlined in FC 1160, section 5.
- 5. REUSABLE GLASS COMPOSITE SAMPLE CONTAINERS
  - 5.1. If containers are used to collect samples that contain oil, grease or other hard to remove materials, it may be necessary to rinse the container several times with reagent-grade acetone before the detergent wash. If material cannot be removed with acetone, discard the container.
  - 5.2. Wash containers following the procedure outlined in FC 1131 above. End with a final solvent rinse if organics are to be sampled.
  - 5.3. Invert containers to drain and air dry for at least 24 hours.
  - 5.4. Cap with aluminum foil, Teflon film or the decontaminated Teflon-lined lid.
  - 5.5. After use, rinse with water in the field, seal with aluminum foil to keep the interior of the container wet, and return to the laboratory or base of operations.
  - 5.6. Do not recycle or reuse containers if:
    - 5.6.1. They were used to collect in-process (i.e., untreated or partially treated) wastewater samples at industrial facilities:
    - 5.6.2. A visible film, scale or discoloration remains in the container after the cleaning procedures have been used; or
    - 5.6.3. The containers were used to collect samples at pesticide, herbicide or other chemical manufacturing facilities that produce toxic or noxious compounds. Such containers must be properly disposed of (preferably at the facility) at the conclusion of the sampling activities.
    - 5.6.4. If the containers described above are reused, check no less than 10% of the cleaned containers for the analytes of interest <u>before</u> use. If found to be contaminated, (i.e., constituents of interest are found at method detection levels or higher), the <u>discard</u> the containers.
- 6. REUSABLE PLASTIC COMPOSITE SAMPLE CONTAINERS
  - 6.1. Follow FC 1132.
  - 6.2. Inspect the containers. Determine if the containers can be reused by the criteria in FC 1140, section 5 above.

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- 7. GLASS SEQUENTIAL SAMPLE BOTTLES FOR AUTOMATIC SAMPLER BASED FOR SEQUENTIAL MODE
  - Clean glass sequential sample bottles to be used for collecting inorganic samples by using a laboratory dishwasher (see FC 1140, sections 7.1.1 through 7.1.3 below) or manually following the procedures in FC 1131.
    - 7.1.1. Rinse with appropriate acid solution (see FC 1001, section 4).
    - 7.1.2. Rinse thoroughly with tap water.
    - 7.1.3. Wash in dishwasher at wash cycle, using laboratory detergent cycle, followed by tap and analyte-free water rinse cycles.
  - Replace bottles in covered, automatic sampler base; cover with aluminum foil for 7.2. storage.
  - Rinse bottles in the field with water as soon as possible after sampling event. 7.3.
- 8. Glass Sequential Sample Bottles (Automatic Sampler based for Sequential Mode) to be used for Collecting Samples for Organic Compounds
  - Use cleaning procedures outlined in FC 1131. Allow containers to thoroughly air dry 8.1. before use.
  - Replace bottles in covered, automatic sampler base; cover with aluminum foil for 8.2. storage.
- 9. BOTTLE SIPHONS USED TO TRANSFER SAMPLES FROM COMPOSITE CONTAINERS
  - Rinse tubing with solvent and dry overnight in a drying oven.
  - Cap ends with aluminum foil and/or Teflon film for storage. 9.2.
  - Seal in plastic for storage and transport. 9.3.
  - Flush siphon thoroughly with sample before use. 9.4.
- 10. REUSABLE TEFLON COMPOSITE MIXER RODS
  - 10.1. Follow procedures outlined in FC 1131.
  - 10.2. Wrap in aluminum foil for storage.

#### FC 1150. FILTRATION EQUIPMENT

- 1. DISSOLVED CONSTITUENTS USING IN-LINE, MOLDED AND DISPOSABLE FILTER UNITS
  - 1.1. Peristaltic Pump
    - 1.1.1. Clean the pump following procedures in FC 1170, section 2.2.
    - 1.1.2. Clean the pump head tubing following FC 1160, section 4.
    - 1.1.3. If Teflon tubing is used, clean following the procedures in FC 1160, section 3.
    - 1.1.4. Clean other tubing types such as polyethylene according to the appropriate procedures listed in FC 1160, section 7.
  - Other Equipment Types (e.g., pressurized Teflon bailer) 1.2.
    - 1.2.1. Follow the appropriate cleaning regimen specified in FC 1131 through FC 1132 for other types of equipment that utilize in-line, molded and disposable filters.

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# Note: filtration units for dissolved metals must follow the configuration and requirements outlined in FS 2225.

2. DISSOLVED CONSTITUENTS USING NON-DISPOSABLE FILTRATION UNITS (E.G., SYRINGES, "TRIPOD ASSEMBLY")

#### 2.1. Stainless Steel or Glass Units

- 2.1.1. Follow FC 1131, assembling and applying pressure to the apparatus after each rinse step (water and acid) to drive rinsing solution through the porous filter holder in the bottom of the apparatus.
- 2.1.2. Remove and clean any transfer tubing according to the appropriate cleaning procedures (see FC 1160).
- 2.1.3. Assemble the unit and cap both the pressure inlet and sample discharge lines (or whole unit if a syringe) with aluminum foil to prevent contamination during storage.
- 2.1.4. If the unit will not be used to filter volatile or extractable organics, seal the unit in an untreated plastic bag to prevent contamination.

#### 2.2. Reusable In-Line Filter Holders

- 2.2.1. Clean, using FC 1131, (if Teflon, glass or stainless steel) or FC 1132 (if plastic) assembling and applying pressure to the apparatus after each rinse step (water and acid) to drive rinsing solution through the porous filter holder in the bottom of the apparatus.
- 2.2.2. Assemble the unit and wrap with aluminum foil to prevent contamination during storage.
- 2.2.3. If the unit will **not** be used to filter volatile or extractable organics, seal the unit in an untreated plastic bag to prevent contamination.

#### 3. FILTERS

3.1. Do not clean filters. Instructions for rinsing the filters prior to use are discussed in the applicable sampling SOPs (FS 2000 - FS 8000).

## FC 1160. SAMPLE TUBING DECONTAMINATION

- 1. Check tubing:
  - 1.1. For discoloration: Remove discolored tubing from use until it can be cleaned. If the discoloration cannot be removed, discard the tubing.
  - 1.2. For elasticity (if used in a peristaltic-type pump): Discard any tubing that has lost its elasticity.
- 2. Transport all tubing to the field in precut, precleaned sections.
- 3. TEFLON, POLYETHYLENE AND POLYPROPYLENE TUBING
  - 3.1. <u>New Tubing</u>: Follow this procedure unless the manufacturer/supplier provides certification that the tubing is clean.

#### 3.1.1. <u>Teflon</u>

3.1.1.1. Rinse outside of tubing with pesticide-grade solvent (see FC 1001, section 2).

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- 3.1.1.2. Flush inside of tubing with pesticide-grade solvent.
- 3.1.1.3. Dry overnight in drying oven or equivalent (zero air, nitrogen, etc.).

#### 3.1.2. Polyethylene and Polypropylene

- 3.1.2.1. Clean the exterior and interior of the tubing by soaking in hot, sudsy water.
- 3.1.2.2. Thoroughly rinse the exterior and interior of the tubing with tap water, followed by analyte-free water.

#### 3.2. Reused Tubing

Use the following procedure for in-lab cleaning. Field cleaning is not recommended:

- 3.2.1. Clean the exterior of the tubing by soaking in hot, sudsy water (see FC 1001, section 1) in a stainless steel sink (or equivalent non-contaminating material). Use a brush to remove any particulates, if necessary.
- 3.2.2. Use a small bottle brush and clean the inside of the tubing ends where the barbs are to be inserted or cut 1-2 inches from the ends of the tubing after cleaning.
- 3.2.3. Rinse tubing exterior and ends liberally with tap water.
- 3.2.4. Rinse tubing surfaces and ends with the appropriate acid solution (see FC 1001, section 4), tap water, isopropanol (see FC 1001, section 2), and finally analyte-free water.
  - 3.2.4.1. Note: Eliminate the isopropanol rinse for polyethylene or polypropylene tubing.
- 3.2.5. Place tubing on fresh aluminum foil or clean polyethylene sheeting. Connect all of the precut lengths of tubing with Teflon inserts or barbs.

#### 3.2.6. Cleaning configuration:

- 3.2.6.1. Place cleaning reagents: [sudsy water (see FC 1001, section 1); acid (see FC 1001, section 4); isopropanol (see FC 1001, section 2)] in an appropriately cleaned container (2-liter glass jar is recommended).
- 3.2.6.2. Place one end of the Teflon tubing into the cleaning solution.
- 3.2.6.3. Attach the other end of the Teflon tubing set to the influent end of a pump.
- 3.2.6.4. Recycle the effluent from the pump by connecting a length of Teflon tubing from the effluent to the glass jar with the cleaning reagents.
- 3.2.6.5. Recycling as described above may be done for all reagents listed in FC 1160, section 3.2.6.1 above, <u>except</u> the final isopropanol rinse and the final analyte-free water rinse. Disconnect the tubing between the effluent end of the pump and the jar of cleaning reagents.
- 3.2.6.6. Containerize isopropanol in a waste container for proper disposal.
- 3.2.6.7. Analyte-free water may be discarded down the drain.
- 3.2.7. Using the above configuration described in FS 1160, section 3.2.6 above:
  - 3.2.7.1. Pump hot, sudsy water through the connected lengths. Allow the pump to run long enough to pump at least three complete tubing volumes through the tubing set.

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- 3.2.7.2. Using the same procedure, successively pump tap water, the acid solution(s), tap water, isopropanol, and finally analyte-free water through the system.
- 3.2.7.3. Leave the Teflon inserts or barbs between the precut lengths and cap or connect the remaining ends.
- 3.2.8. After the interior has been cleaned as described in FC 1160, section 3.2.7 above, rinse the exterior of the tubing with analyte-free water.
- 3.2.9. Wrap the connected lengths in aluminum foil or untreated butcher paper and store in a clean, dry area until use.
- 4. FLEXIBLE TUBING USED IN PUMP HEADS OF AUTOMATIC SAMPLERS AND OTHER PERISTALTIC PUMPS

Replace tubing after each sampling point if samples are collected through the tubing. Unless the pump is deployed to collect samples from the same location over a long period of time, remove and wash the tubing after each sampling event (see FC 1140, section 1).

- 4.1. Flush tubing with hot tap water then sudsy water (see FC 1001, section 1).
- 4.2. Rinse thoroughly with hot tap water.
- 4.3. Rinse thoroughly with analyte-free water.
- 4.4. If used to collect metals samples, flush the tubing with an appropriate acid solution (see FC 1001, section 4), followed by thorough rinsing with analyte-free water. If used to collect both metals and nitrogen components use hydrochloric acid (see FC 1001, section 4.1.1).
- 4.5. Install tubing in peristaltic pump or automatic sampler.
- 4.6. Cap both ends with aluminum foil or equivalent.

Note: change tubing at specified frequencies as part of routine preventative maintenance.

#### 5. STAINLESS STEEL TUBING

Clean the exterior and interior of stainless steel tubing as follows:

- 5.1. Using sudsy water (see FC 1001, section 1), scrub the interior and exterior surfaces.
- 5.2. Rinse with hot tap water.
- 5.3. Rinse with analyte-free water.
- 5.4. If volatile or extractable organics are to be sampled, rinse all surfaces with isopropanol (see FC 1001, section 2). Use enough solvent to wet all surfaces with free flowing solvent.
- 5.5. Allow to air dry or thoroughly rinse with analyte-free water.

#### 6. GLASS TUBING

- 6.1. Use new glass tubing.
- 6.2. If volatile or extractable organics are to be sampled, rinse with isopropanol (see FC 1001, section 2).
- 6.3. Air dry for at least 24 hours.

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- 6.4. Wrap in aluminum foil or untreated butcher paper to prevent contamination during storage.
- 6.5. Discard tubing after use.
- 7. MISCELLANEOUS NON-INERT TUBING TYPES (TYGON, RUBBER, PVC, ETC.)

#### 7.1. New Tubing

- 7.1.1. As a general rule, new tubing may be used without preliminary cleaning.
- 7.1.2. Protect new tubing from potential environmental contamination by wrapping in aluminum foil and sealing in untreated plastic bags or keep in the original sealed packaging until use.
- 7.1.3. If new tubing is exposed to potential contamination, rinse the exterior and interior tubing surfaces with hot tap water followed by a thorough rinse with analyte-free water.
- 7.1.4. If new tubing is to be used to collect samples, thoroughly rinse the tubing with sample water (i.e., pump sample water through the tubing) before collecting samples.

#### 7.2. Reused Tubing

- 7.2.1. Flush tubing with sudsy solution of hot tap water and laboratory detergent (see FC 1001, section 1).
- 7.2.2. Rinse exterior and interior thoroughly with hot tap water.
- 7.2.3. Rinse exterior and interior thoroughly with analyte-free water.
- 7.2.4. If used to collect only metals samples, flush the tubing with nitric acid (see FC 1001, section 4.1), followed by a thorough rinse with analyte-free water.
- 7.2.5. If used to collect metals and nitrogen-containing compounds, see FC 1001, section 4.3.
- 7.2.6. Cap ends in aluminum foil and store in clean, untreated plastic bags to prevent contamination during storage and transport.

#### FC 1170. PUMPS

- 1. SUBMERSIBLE PUMPS
  - 1.1. <u>Pumps used for Purging and Sampling Metals and/or Volatile and Extractable Organics</u>
    - 1.1.1. Construction of pump body and internal mechanisms (bladders, impellers, etc.), including seals and connections, must follow Tables FS 1000-1, FS 1000-2 and FS 1000-3.
    - 1.1.2. Tubing material must follow Tables FS 1000-1, FS 1000-2 and FS 1000-3.
    - 1.1.3. Clean pump exterior following FC 1131. Note: omit the solvent rinse if the pump body is constructed of plastic (e.g., ABS, PVC, etc.).
    - 1.1.4. Clean the pump internal cavity and mechanism as follows:
      - 1.1.4.1. If used only for purging, thoroughly flush the pump with water before purging the next well.
      - 1.1.4.2. If used for purging and sampling, completely disassemble the pump (if practical) and decontaminate between each well.

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- 1.1.4.3. When used for purging and sampling and the pump cannot be (practicably) disassembled, then clean the internal cavity/mechanism by pumping several gallons of sudsy water (see FC 1001, section 1), followed by several gallons of tap water, and finally, several gallons of analyte-free water.
- 1.1.4.4. If multiple sampling points are located in an area that is not accessible by a vehicle, and it is difficult to return to the vehicle for cleaning or to transport all cleaning materials to the staging location, at a minimum thoroughly rinse the pump with water.
- 1.1.5. Refer to FC 1160, section 3 to clean Teflon tubing.
- 1.1.6. Refer to FC 1160, section 5 for stainless steel tubing.
- 1.1.7. Clean other types of tubing according to FC 1160, sections 6 and 7.
- 1.2. Pumps used for Purging and Sampling all Analytes except Metals and Volatile and Extractable Organics
  - 1.2.1. Pump construction: no restrictions.
  - 1.2.2. Pump tubing material: no restrictions.
  - 1.2.3. Scrub the exterior of the pump with appropriate metal-free, phosphate-free or ammonia-free detergent solution.
  - 1.2.4. Rinse the exterior with tap water and analyte-free water.
  - 1.2.5. Rinse the interior of the pump and tubing by pumping tap or analyte-free water through the system using a clean bucket or drum.
- 2. ABOVE-GROUND PUMPS USED FOR PURGING AND SAMPLING
  - 2.1. Pumps used only for Purging
    - 2.1.1. The exterior of the pump must be free of oil and grease.
    - 2.1.2. Select tubing according to Tables FS 1000-1, FS 1000-2 and FS 1000-3.
    - 2.1.3. Clean the tubing that contacts the formation water according to the appropriate protocol for construction materials specified in FC 1160.
  - 2.2. Pumps used for Sampling
    - 2.2.1. Clean the exterior of the pump with a detergent solution followed by a tap water rinse. Use clean cloths or unbleached paper towels that have been moistened with the appropriate solution to wipe down the pump.
    - 2.2.2. Select tubing according to Tables FS 1000-1, FS 1000-2 and FS 1000-3.
    - 2.2.3. Clean the tubing that contacts the formation water according to the appropriate protocol for construction materials specified in FC 1160.

## FC 1180. ANALYTE-FREE WATER CONTAINERS

This section pertains to containers that are purchased to transport, store and dispense analyte-free water. It does not apply to water that has been purchased in containers. See FC 1002, section 3 for appropriate construction materials.

1. NEW CONTAINERS

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- 1.1. Wash containers and caps according to FC 1131, omitting the solvent rinse if plastic (polyethylene or polypropylene) containers are being cleaned.
- 1.2. Cap with Teflon film or the bottle cap. The bottle cap must be composed of the same material as the container and cannot be lined.

#### 2. REUSED CONTAINERS

- 2.1. Immediately after emptying, cap with aluminum foil (if not being used for metals), Teflon film or the container cap.
- 2.2. Wash the exterior of the container with lab-grade detergent solution (see FC 1001, section 1) and rinse with analyte-free water.
- 2.3. Rinse the interior thoroughly with analyte-free water.
- 2.4. Invert and allow to drain and dry.

#### FC 1190. ICE CHESTS AND SHIPPING CONTAINERS

- 1. Wash the exterior and interior of all ice chests with laboratory detergent (see FC 1001, section 1) after each use.
- 2. Rinse with tap water and air dry before storing.
- 3. If the ice chest becomes severely contaminated with concentrated waste or other toxic or hazardous materials clean as thoroughly as possible, render unusable, and properly dispose.

## FC 1200. Field Instruments and Drilling Equipment

## FC 1210. FIELD INSTRUMENTS (TAPES, METERS, ETC.)

Follow manufacturer's recommendations for cleaning instruments. At a minimum:

- 1. Wipe down equipment body, probes, and cables with lab-grade detergent solution (see FC 1001, section 1). Check manufacturer's instructions for recommendations and/or restrictions on cleaning.
- Rinse thoroughly with tap water.
- 3. Rinse thoroughly with analyte-free water.
- 4. Store equipment according to the manufacturer's recommendation or wrap equipment in aluminum foil, untreated butcher paper or untreated plastic bags to eliminate potential environmental contamination.

#### FC 1220. SOIL BORING EQUIPMENT

This section pertains only to equipment that is not used to collect samples. Clean split spoons, bucket augers and other sampling devices according to FC 1131.

- 1. Remove oil, grease, and hydraulic fluid from the exterior of the engine and power head, auger stems, bits and other associated equipment with a power washer or steam jenny or wash by hand with a brush and sudsy waster (no degreasers).
- 2. Rinse thoroughly with tap water.

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## FC 1230. WELL CASING CLEANING

These are recommended procedures for cleaning well casing and riser pipes. Use procedures specified by a FDEP contract, order, permit, or rule, if different or more stringent than the procedures outlined below.

- 1. FDEP recommends only using casing that is designed for subsurface environmental groundwater monitoring.
- 2. Casing that has been contaminated with grease, hydraulic fluid, petroleum fuel, etc. may require additional cleaning or deemed unusable.
- 3. Clean all casing and riser pipe should be cleaned before installation, unless the casing is received wrapped and ready for installation:
  - 3.1. Steam clean all casing and riser pipe. Steam cleaning criteria shall meet the following: water pressure 2500 psi; water temperature 200°F.
  - 3.2. Rinse thoroughly with tap (potable) water. This tap water must be free of the analytes of interest.

## FC 1300. Sample Containers

## FC 1310. OBTAINING CLEAN CONTAINERS

- 1. Obtain clean sample containers in one of three ways:
  - 1.1. From commercial vendors as precleaned containers. The cleaning grades must meet EPA analyte specific requirements. Keep all records for these containers (lot numbers, certification statements, date of receipt, etc.) and document the container intended uses;
  - 1.2. From internal groups within the organization that are responsible for cleaning and maintaining containers according to the procedures outlined in FC 1320; or
  - 1.3. From a subcontracted laboratory that is accredited under the National Environmental Laboratory Accreditation Program (NELAP).
    - 1.3.1. The contractor must verify that the laboratory follows the container cleaning procedures outlined in FC 1320.
    - 1.3.2. If the laboratory cleaning procedures are different, the contractor must require that the laboratory use the following cleaning procedures or provide documentation and historical records to show that their in-house procedure produces containers that are free from the analytes of interest.

## FC 1320. CONTAINER CLEANING PROCEDURES

- 1. Refer to Table FC 1000-2. Follow the cleaning steps in the order specified in the chart.
- 2. Cleaning procedures that are different from those outlined in FC 1320 may be used as long as blanks collected in the containers are free from the analytes of interest and any analytical interferences and the cleaning procedures are supported by historical and continuing documentation.
- Inspect all containers before cleaning.

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## 3.1. Do not recycle or reuse containers if:

- 3.1.1. Containers were used to collect in-process (i.e., untreated or partially treated) wastewater samples at industrial facilities;
- 3.1.2. A visible film, scale or discoloration remains in the container after the cleaning procedures have been used; or
- 3.1.3. Containers were used to collect samples at pesticide, herbicide or other chemical manufacturing facilities that produce toxic or noxious compounds. Such containers shall be properly disposed of (preferably at the facility) at the conclusion of the sampling activities.
- 3.1.4. If the containers described above are reused, check no less than 10% of the cleaned containers for the analytes of interest before use. If found to be contaminated (i.e., analytes of interest are found at MDL levels or higher), discard the containers.

### FC 1400. Documentation

Retain all documentation as permanent records for at least five years. If the documentation is associated with samples that are associated with a civil or criminal enforcement case, the court system may require that records be retained for longer periods of time.

#### FC 1410. FIELD EQUIPMENT

- 1. IN-FIELD CLEANING
  - 1.1. Initially identify the procedures that are used to clean equipment in the field by SOP numbers and dates of usage.
  - Record the date and time that equipment was cleaned.
- 2. IN-HOUSE CLEANING
  - 2.1. Retain any cleaning certificates, whether from a laboratory or commercial vendor.
  - 2.2. Identify the procedure(s) that are used to clean equipment by the SOP number and dates of usage.
  - 2.3. Record the date that the equipment was cleaned.

#### FC 1420. SAMPLE CONTAINERS

- 1. Organizations that order precleaned containers must retain the packing slips, and lot numbers of each shipment, any certification statements provided by the vendor and the vendor cleaning procedures.
- 2. Organizations that clean containers must maintain permanent records of the following:
  - Procedure(s) used to clean containers by SOP number and dates of usage.
  - 2.2. If containers are certified clean by the laboratory the laboratory must record:
    - Type of container;
    - · Date cleaned;
    - SOP used;

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- Person responsible for cleaning;
- Lot number (date of cleaning may be used) of the batch of containers that were cleaned using the same reagent lots and the same procedure;
- The results of quality control tests that were run on lot numbers; and
- Any additional cleaning or problems that were encountered with a specific lot.

## FC 1430. REAGENTS AND OTHER CLEANING SUPPLIES

Maintain a record of the lot number with the inclusive dates of use for all acids, solvents, and other cleaning supplies.

## FC 2000. REFERENCES

- 1. Florida Department of Environmental Protection, <u>DEP Standard Operating Procedures for Laboratory Operations and Sample Collection Activities, DEP QA-001/92,</u> September 1992.
- 2. U.S. Environmental Protection Agency, Region 4, Environmental Investigations Standard Operating Procedures and Quality Assurance Manual, May 1996

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## Appendix FC 1000 Tables, Figures and Forms

Table FC 1000-1 Procedures for Decontamination at the Base of Operations or On-site Table FC 1000-2 Container Cleaning Procedures

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DEP-? 701/01 FC 1000 Cleaning / Dev...amination Procedures

Table FC 1000-1 Procedures for Decontamination at the Base of Operations or On-Site

Construction				
Material	Analyte Group Sampled	SOP Reference	Base of Operations	On-Site
Teflon or Glass	Ail	FC 1131	Follow as written	May substitute ambient temperature water for the hot
	Extractable & Volatile Organics Petroleum Hydrocarbons		May omit acid rinse	water rinses and hot detergent solution May substitute ambient temperature water for the hot water rinses and hot detergent solution
	Metals' Radionuclides For ultra trace metals, refer to FS 8200		May omit solvent rinse	May substitute ambient temperature water for the hot water rinses and hot detergent solution May omit solvent rinse
	Inorganic Nonmetallics Physical & Aggregate Properties Aggregate Organics Biologicals		May omit solvent rinse	Rinse several times with water Rinse several times with sample water from the next sampling location
	Volatile Inorganics			
	Microbiological – Viruses Microbiological - Bacteria	·	Omit solvent and acid rinses	Rinse several times with water Rinse several times with sample water from the next
Metallic	Ail	FC 1131	Omit the acid ringe	Sampling location
(stainless steel, brass, etc.)	Extractable & Volatile Organics Petroleum Hydrocarbons			way substitute amplent temperature water for the hot water rinses and hot detergent solution Omit the acid rinse
	Radionuclides		Omit the acid rinse May omit the solvent rinse	May substitute ambient temperature water for the hot water rinses and hot detergent solution Omit the acid rinse
	Inorganic Nonmetallics Physical & Aggregate Properties Aggregate Organics	10 -	Omit solvent rinse May omit the acid rinse	Rinse several times with water Rinse several times with sample water from the next sampling location
	Biologicals Volatile Inorganics			

DEP-5 701/01 FC 1000 Cleaning / Dev. ..amination Procedures

Table FC 1000-1 Procedures for Decontamination at the Base of Operations or On-Site

Construction					
Material	Analyte Group Sampled	SOP Reference	Base of Operations	On-Site	
	Microbiological – Viruses Microbiological - Barteria		Omit solvent and acid	Rinse several times with water	-
Diretio			rinses	Rinse several times with sample water from the next	
T lastic	All except Volatile and Extractable Organics	FC 1132	Follow as written	May substitute ambient temperature water for the hot	
	and Petroleum Hydrocarbons			water rinses and hot detergent solution	
	Inorganic Nonmetallics		May omit the soid	:	
	Physical & Aggregate Properties		rinse	Rinse several times with water Rinse several times with sample water from the next	
	Aggregate Organics			sampling location	
	Volatile Inorganics				
	Microbiological - Viruses	1	Omit acid rinsa		
	Microbiological - Bacteria			Rinse several times with water Rinse several times with sample water from the north	
				sampling location	

<sup>i</sup> Do not use glass if collecting samples for boron or silica.

# DEP-SOP-001/01 FC 1000 Cleaning / Decontamination Procedures

#### Table FC 1000-2 Container Cleaning Procedures

ANALYSIS / ANALYTE GROUP	CLEANING STEPS See Description Below
Extractable Organics	1, 2, 4, 6, (5 and 7 optional), 11
Volatile Organics	1, 2, 4, (6 optional, methanol only), 7
Metals	1, 2, 3, 4, 8, 11 **  **Procedures to clean containers for ultra- trace metals are found in FS 8200
Inorganic Nonmetallics, Radionuclides, Physical and Aggregate Properties, Aggregate Inorganics, and Volatile Inorganics	1, 2, 3*, 4, 8, 11 * For nutrients, replace nitric acid with hydrochloric acid, or use a hydrochloric acid rinse after the nitric acid rinse. See FC 1001, section 4
Petroleum Hydrocarbons, and Oil and Grease	1, 2, 3, 4, (5, 6, 7 optional), 11
Microbiological (all)	1, 2, 4, 8, 9, 11
Toxicity Tests (Includes Bioassays)	1, 2, 10, 2, 4, 6.1, (10 optional), 11

NOTE: Steps 1 and 2 may be omitted when cleaning new, uncertified containers.

- 1. Wash with hot tap water and a brush using a suitable laboratory-grade detergent:
  - 1.1. Volatile and Extractable Organics, Petroleum Hydrocarbon, Oil and Grease: Liqui-Nox, Alconox or equivalent;
  - 1.2. Inorganic nonmetallics: Liqui-Nox or equivalent;
  - 1.3. Metals: Liqui-Nox, Acationox, Micro or equivalents:
  - 1.4. Microbiologicals (all): Must pass an inhibitory residue test.
- 2. Rinse thoroughly with hot tap water.
- 3. Rinse with 10% nitric acid solution.
- 4. Rinse thoroughly with analyte-free water (deionized or better).
- 5. Rinse thoroughly with pesticide-grade methylene chloride.
- 6. Rinse thoroughly with pesticide-grade isopropanol, acetone or methanol.
  - 6.1. For bioassays, use only acetone, and only when containers are glass.
- 7. Oven dry at 103°C to 125°C for at least 1 hour.
  - 7.1. VOC vials and containers must remain in the oven in a contaminant-free environment until needed. They should be capped in a contaminant-free environment just prior to dispatch to the field.

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## DEP-SOP-001/01 FC 1000 Cleaning / Decontamination Procedures

## Table FC 1000-2 **Container Cleaning Procedures**

- 8. Invert and air-dry in a contaminant-free environment.
- 9. Sterilize containers:
  - 9.1. Plastic: 60 min at 170°C, loosen caps to prevent distortion.
  - 9.2. Glass: 15 min at 121°C.
- 10. Rinse with 10% hydrochloric acid followed by a sodium bicarbonate solution.
- 11. Cap tightly and store in a contaminant-free environment until use. Do not use glass if collecting samples for boron or silica.

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# BROWNFIELDS ASSESSMENT. OCALA, FLORIDA FOIA 2019-003937

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# APPENDIX I-3 FD 1000 - DOCUMENTATION PROCEDURES

## FD 1000. DOCUMENTATION PROCEDURES

- 1. INTRODUCTION: For the creation of unequivocal, accurate and methodical records to document all field activities affecting sample data, implement the following standard operating procedures for sample collection, sample handling and field-testing activities.
- 2. SCOPE AND APPLICABILITY
  - 2.1. This SOP provides a detailed listing of the information required for documentation of all sampling procedures and field testing.
  - 2.2. Refer to the associated sampling or field testing SOP for any requirements for the chronological or sequential documentation of data.
- 3. QUALITY ASSURANCE: Implement review procedures to monitor and verify accurate manual and automated data entry and recordkeeping for all documentation tasks outlined in this SOP.

## FD 1100. Universal Documentation Requirements

Incorporate efficient archival design and succinct documentation schemes for all record systems. Ensure that the history of a sample is clearly evident in the retained records and documentation and can be independently reconstructed.

- 1. CRITERIA FOR ALL DOCUMENTS
  - 1.1. Keep all applicable documentation available for inspection. Keep all original data and records as well as reduced or manipulated forms of the original data or records.
    - 1.1.1. Authorized representatives of FDEP may legally inspect and request copies of any records using paper, electronic digital media or other media during any FDEP audit of physical facilities or on-site sampling events, and for any data validations conducted for applicable project data submitted to FDEP.
  - 1.2. Record enough information so that clarifications, interpretations or explanations of the data are not required from the originator of the documentation.
  - 1.3. Clearly indicate the nature and intent of all documentation and all record entries.
  - 1.4. Link citations to SOPs and other documents by the complete name, reference or publication number, revision number and revision date for the cited document, when applicable. Also assign this information to internally generated SOPs.
  - 1.5. Retain copies of all revisions of all cited documents as part of the documentation archives.

#### 2. PROCEDURES

- 2.1. Sign, initial or encode all documentation entries made to paper, digital/electronic or other records with a link indicating the name and responsibility of the author making the data entry, clearly indicating the reason for the signature, initials or code (e.g., "sampled by"; "released by"; "prepared by"; "reviewed by").
- 2.2. In order to abbreviate record entries, make references to procedures written in internal SOPs or methodology and procedures promulgated by external sources.

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- 2.2.1. Document the intent to use SOPs other than the FDEP SOPs, or to use allowable modifications to the FDEP SOPs by recording the effective date of use for all such SOPs or modifications.
  - 2.2.1.1. Retain any correspondence with FDEP regarding approval to use alternative procedures for any projects.
- 2.2.2. Authorize all internal SOPs with the signatures of the quality assurance officer(s) and manager(s) responsible for implementation of the SOPs. Record the dates of signature.
- 2.3. Employ straightforward archiving of records to facilitate documentation tracking and retrieval of all current and archived records for purposes of inspection, verification and historical reconstruction of all procedures and measurement data.
- 2.4. Keep copies or originals of all documentation, including documentation sent to or received from external parties.
- 2.5. Use waterproof ink for all paper documentation.
- 2.6. Do not erase or obliterate entry errors on paper records. Make corrections by marking a line through the error so that it is still legible. Initial or sign the marked error and its correction.
- 2.7. Maintain electronic audit trails for all edited electronic digital records, if possible. Utilize software that allows tracking of users and data edits, if available. Software that prompts the user to double-check edits before execution is also preferred. See FD 1200.
- 2.8. Unequivocally link all documentation associated with a sample or measurement. Make cross-references to specific documentation when necessary.
- 2.9. Link final reports, data summaries or other condensed versions of data to the original sample data, including those prepared by external parties.
- 3. RETENTION REQUIREMENTS
  - 3.1. Per the FDEP QA Rule, 62-160.220 & .340, F.A.C., keep all documentation archives for a minimum of 5 years after the date of project completion or permit cycle unless otherwise specified in a Department contract, order, permit or Title 62 rules.

## FD 1200. Electronic and Digital Documentation

Handle electronic digital data as with any data according to applicable provisions of FD 1100.

- 1. RETENTION OF AUTOMATIC DATA RECORDING PRODUCTS
  - 1.1. For data not directly read from the instrument display and manually recorded, retain all products or outputs from automatic data recording devices, such as strip chart recorders, integrators, data loggers, field measurement devices, computers, etc. Store records in electronic, magnetic, optical or paper form, as necessary.
    - 1.1.1. Retain all original, raw output data. Ensure archiving of these data prior to subsequent reduction or other manipulation of the data.
  - 1.2. Identify output records as to purpose, analysis date and time, field sample identification number, etc. Maintain unequivocal linkage with the associated sample, other data source or measured medium and specific instrument used to make the measurement.
- 2. ELECTRONIC DIGITAL DATA SECURITY

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- 2.1. Control levels of access to electronic digital data systems as required to maintain system security and prevent unauthorized editing of data.
- 2.2. Do not alter raw instrumentation data or original manual data records in any fashion without retention of the original raw data.
- 2.3. Maintain secure computer networks and appropriate virus protection as warranted for each system design.
- 3. ELECTRONIC DATA STORAGE AND DOCUMENTATION
  - 3.1. Store all electronic, magnetic and optical media for easy retrieval of records.
    - 3.1.1. Ensure that all records can be printed to paper if needed for audit or verification purposes.
    - 3.1.2. If it is anticipated that the documentation archive will become unreadable due to obsolescence of a particular storage technology, retain a paper archive of the data or transfer to other suitable media.
  - 3.2. For easy retrieval of records, link all stored data to the associated sample data or other data source.
  - 3.3. Back up all data at a copy rate commensurate with the level of vulnerability of the data. Consider replicating all original data as soon as possible after origination.
- 4. SOFTWARE VERIFICATION
  - 4.1. Ensure that any software used to perform automatic calculations conforms to required formulas or protocols.
  - 4.2. Document all software problems and their resolution in detail, where these problems have irretrievably affected data records or linkage. Record the calendar date, time, responsible personnel and relevant technical details of all affected data and software files. Note all software changes, updates, installations, etc. per the above concerns. File and link all associated service records supplied by vendors or other service personnel.
- 5. PROTECTION OF EQUIPMENT AND STORAGE MEDIA
  - 5.1. Place stationary computers, instrumentation and peripheral devices in locations of controlled temperature and humidity and away from areas where the potential for fluid leaks, fire, falling objects or other hazards may exist. In the field, protect portable equipment from weather, excess heat or freezing, storage in closed vehicles, spillage from reagents and samples, etc.
  - 5.2. Protect storage media from deteriorating conditions such as temperature, humidity, magnetic fields or other environmental hazards as above.

## FD 1300. Documentation Using Other Media

- 1. UNIVERSAL REQUIREMENTS
  - Handle documentation prepared using other media according to FD 1100.
- 2. PROTECTION OF STORED MEDIA
  - 2.1. Store media such as photographs, photographic negatives, microfilm, videotape, etc. under conditions generally prescribed for these media by manufacturers and conducive to long-term storage and protection from deterioration. See also FD 1200, section 5, above.

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## FD 2000. DOCUMENTATION OF CLEANED EQUIPMENT, SAMPLE CONTAINERS, REAGENTS AND SUPPLIES

When providing sample containers, preservation reagents, analyte-free water or sampling equipment, document certain aspects of these preparations.

#### 1. EQUIPMENT CLEANING DOCUMENTATION

- 1.1. Document all cleaning procedures by stepwise description in an internal SOP if cleaning procedures in the FDEP SOP have been modified for use.
- 1.2. Retain any certificates of cleanliness issued by vendors supplying cleaned equipment or sample containers.
- 1.3. If items are cleaned in the field during sampling activities for a site, document the date and time when the affected equipment was cleaned.

#### 2. SAMPLING KIT DOCUMENTATION

Transmit to the recipient the following information pertaining to sampling equipment or other implements, sample containers, reagent containers, analyte-free water containers, reagents or analyte-free water supplied to the recipient.

- Quantity, description and material composition of all containers, container closures or closure liners
- Intended application for each sample container type indicated by approved analytical method or analyte group(s)
- Type and concentration of preservative added to clean sample containers and/or shipped as additional preservative
- Intended use of any additional preservatives or reagents
- Description of any analyte-free water (i.e., deionized, organic-free, etc.)
- Date of analyte-free water containerization
- Date of sampling kit preparation
- Description and material composition of all reagent transfer implements (e.g., pipets) shipped in the sampling kit
- Intended use of all implements
- Quantity, description and material composition of all sampling equipment
- Tare weight of VOC vials, as applicable (this item may be necessary in cases where EPA 5035 VOC sample vials are provided by a third party supplier)

#### 3. DOCUMENTATION FOR REAGENTS AND OTHER CHEMICALS

3.1. Keep a record of the lot numbers and inclusive dates of use for all reagents, detergents, solvents and other chemicals used for cleaning, field testing and sample preservation.

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## FD 3000. DOCUMENTATION OF EQUIPMENT MAINTENANCE

- 1. Log all maintenance and repair performed for each instrument unit, including routine cleaning procedures and solution or parts replacement for instrument probes.
  - 1.1. Include the calendar date for the procedures performed.
  - 1.2. Record names of personnel performing the maintenance or repair tasks.
    - 1.2.1. Describe any malfunctions necessitating repair or service.
  - 1.3. Designate the identity of specific instrumentation in the documentation with a unique description or code for each instrument unit employed. This may include a manufacturer name, model number, serial number, inventory number, etc.
- 2. Retain vendor service records for all affected instruments.
- 3. Record the following for rented equipment:
  - Rental date(s)
  - Equipment type and model or inventory number or other description
- 4. Retain the manufacturer's operating and maintenance instructions.

## FD 4000. DOCUMENTATION FOR CALIBRATION OF FIELD-TESTING INSTRUMENTS AND FIELD ANALYSES

Document acceptable instrument or measuring system calibration for each field test or analysis of a sample or other measurement medium.

#### FD 4100. General Documentation for all Field Testing

- 1. Link standard preparation and working standards to intermediate and primary standards used in all calibrations.
  - 1.1. Record the concentration or other value for the standard in the appropriate measurement units.
    - 1.1.1. Note vendor catalog number and description for preformulated solutions as well as for neat liquids and powdered standards.
    - 1.1.2. Retain vendor assay specifications for standards as part of the calibration record.
      - 1.1.2.1. Record the grade of standard used.
  - 1.2. When formulated in-house, document all calculations used to formulate calibration standards.
    - 1.2.1. Record the date of preparation for all in-house formulations.
  - 1.3. Record expiration dates for all calibration standards.
    - 1.3.1. Document acceptable assay or calibration response or verification of any standard used after an expiration date.
  - 1.4. Describe or cite the procedure(s) used to prepare any standards in-house (FDEP SOP or internal SOP).

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- 2. Document acceptable calibration and calibration verification for each instrument unit and field test or analysis, linking this record with affected sample measurements. Retain vendor certifications of all factory-calibrated instrumentation.
  - 2.1. Designate the identity of specific instrumentation in the documentation with a unique description or code for each instrument unit employed.
    - 2.1.1. Record manufacturer name, model number and identifying number such as a serial number for each instrument unit.
  - 2.2. Record the time and date of all calibrations, calibration checks and verifications.
    - 2.2.1. Record the result (value in appropriate measurement units) of all calibrations, calibration checks and verifications.
  - 2.3. Record the name of the analyst(s) performing the calibration.
  - 2.4. Document the specific standards used to calibrate or check (verify) the instrument or field test.
  - 2.5. Specify the calibration acceptance criteria and the calibration check or verification acceptance criteria for each instrument unit and field test or analysis.
    - 2.5.1. Retain manufacturers' instrument specifications or acceptable recoveries specified by QC check sample suppliers as part of the calibration record, if these data are used as calibration acceptance criteria. Link these records to the affected samples, instrument unit and field test.
    - 2.5.2. Document the result(s) indicating that successful calibration acceptance occurred.
    - 2.5.3. Document the result(s) indicating whether the calibration check or verification passed or failed.
  - 2.6. Document any corrective actions taken prior to recalibration after a failed check or verification.
    - 2.6.1. Note any incidence of discontinuation of use of the instrument due to calibration failure.
  - 2.7. Describe or cite the specific calibration or check procedure performed (FDEP SOP or internal SOP).

# FD 5000. DOCUMENTATION OF SAMPLE COLLECTION, PRESERVATION AND TRANSPORT

Follow these procedures for all samples. See FD 5100 - FD 5427 below for additional documentation for specific sampling activities. See example Forms in FD 9000, below for additional documentation requirements for specific sampling and testing procedures.

- 1. SAMPLE IDENTIFICATION REQUIREMENTS
  - 1.1. Label or tag each sample container with a unique field identification code that distinguishes each sample container from all others.
    - 1.1.1. Link the unique field identification code to the sample source or sampling point identification, the analytes of interest, the preservation technique and sample replicate

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sequence. Make sure the code is different from codes assigned to any other sample containers.

- 1.2. Attach the label or tag so that it does not contact any portion of the sample that is removed or poured from the container.
- 1.3. Record the unique field identification code on all other documentation associated with the specific sample container.
- 2. GENERAL REQUIREMENTS FOR SAMPLING DOCUMENTATION: Record the following information for all sampling.
  - 2.1. Names of all sampling team personnel on site during sampling
  - 2.2. Date and time of sample collection (indicate hours and minutes)
    - 2.2.1. Use 24-hour clock time or indicate A.M. and P.M.
    - 2.2.2. Note the exact time of collection for individual sample containers for time-sensitive analyses of less than 24 hours maximum holding time.
  - 2.3. Ambient field conditions, to include, but not limited to information such as weather, tides, etc.
  - 2.4. Specific description of sample location including site name and address
    - 2.4.1. Describe the specific sampling point (e.g., monitoring well identification number, outfall number, station number, etc.).
    - 2.4.2. Determine latitude and longitude of sampling source location using GPS (if available)
    - 2.4.3. Locate sampling points on scaled maps or drawings where applicable.
  - 2.5. Unique field identification code for each sample container and parameters to be analyzed
  - 2.6. Matrix sampled
  - 2.7. Field-testing measurement data, to include the following:
    - Project name
    - Date and time of measurement or test
    - Source and location of the measurement or test sample (e.g., monitoring well identification number, outfall number, station number or other description)
    - Latitude and longitude of sampling source location determined by GPS (if available)
    - Analyte or parameter measured
    - Measurement or test sample value in appropriate reporting units
    - Analyst(s) performing the measurement(s) or test(s)
    - Unique identification of the specific instrument unit(s) used for the test(s)
  - 2.8. Calibration records for field-testing equipment
    - 2.8.1. See FD 4000 above for specific details.

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- 2.9. Preservation for each container
  - 2.9.1. See FD 5100, section 4 below.
- 2.10. Purging and sampling equipment used
- 2.11. Types, number, collection location and collection sequence of quality control samples
- 2.12. Use of fuel powered vehicles and equipment
- 2.13. Number of subsamples and amount of each subsample in any composite samples
  - 2.13.1. Include sufficient location information for the composite subsamples per 2.4 above.
- 2.14. Signature(s) or initials of sampler(s)
- 3. SAMPLE TRANSMITTAL RECORDS: Transmit the following information to the analytical laboratory or other receiving party. Link transmittal records with a given project and retain all transmittal records.
  - 3.1. Site name and address
    - 3.1.1. Client code is acceptable if samples are considered sensitive information and if the field records clearly trace the code to a specified site and address.
  - 3.2. Date and time of sample collection
  - 3.3. Name of sampler responsible for sample transmittal
  - 3.4. Unique field identification codes for each sample container
  - 3.5. Total number of samples
  - 3.6. Required analyses
  - 3.7. Preservation protocol
  - 3.8. Comments about sample or sample conditions
  - 3.9. Identification of common carrier (if used)
- 4. SAMPLE TRANSPORT
  - 4.1. If shipping transmittal forms in the transport containers with the samples, place the forms in a waterproof enclosure and seal.
  - 4.2. For common carrier shipping, seal transport containers securely with strapping tape or other means to prevent lids from accidentally opening.
    - 4.2.1. Keep all shipping bills from common carriers with archived transmittal records.
- 5. ANCILLARY FIELD RECORDS: Link any miscellaneous or ancillary records (photographs, videotapes, maps, etc.) to specific sampling events such that these records are easily traceable in the data archives associated with the project, sampling date and sample source(s).

## FD 5100. Documentation Specific To Aqueous Chemistry Sampling

- 1. SAMPLE PRESERVATION: Record the following for all samples:
  - 1.1. Chemical preservative name(s)
  - 1.2. pH verification (if applicable)

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- 1.3. Amount/quantity of preservative added to sample or amount/quantity of additional preservative added (if using sample containers with premeasured preservatives)
  - 1.3.1. For documentation of preservation for routine samples, defer to SOPs for this information.
  - 1.3.2. Record instances of deviation from preservation protocols found in SOPs for non-routine or problematic samples.
- 1.4. Use of ice or other cooling method, if applicable.
- 2. GROUNDWATER SAMPLING
  - 2.1. Record the following for all samples. See section 3 below for in-place plumbing:
    - · Purging equipment used
    - · Well casing composition and diameter of well casing
    - Water table depth and well depth
    - Calculations used to determine purge volume
    - Total amount of water purged
    - Date well was purged
    - Sampling equipment used
    - Well diameter.
    - Total depth of well
    - Depth to groundwater
    - Volume of water in the well
    - Purging method
    - Times for beginning and ending of purging
    - Total volume purged
    - Times of stabilization parameter measurements
    - Purging rate, including any changes in rate
    - Temperature measurements
    - pH measurements
    - Specific conductance measurements
    - Dissolved oxygen measurements
    - Turbidity measurements
    - Site or monitor well conditions impacting observed dissolved oxygen and turbidity measurements
    - Color of groundwater
    - Odor of groundwater
  - 2.2. Record the following for Water Level and Purge Volume Determination (FS 2211):

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- Depth to groundwater
- Total depth of well
- Length of water column
- Well diameter
- Volume of water in the well
- Volume of pump
- Tubing diameter
- Length of tubing
- Volume of flow cell
- Volume in the pumping system
- 2.3. Record the following for Well Purging (FS 2212)
  - Calculations for pumping rates, including any changes in rates
  - Flow meter readings
  - Volume of water purged
  - Time needed to purge one (1) well volume or purging equipment volume
  - Well volumes or purging equipment volumes purged
  - Temperature measurements
  - pH measurements
  - Specific conductance measurements
  - Dissolved oxygen measurements
  - Turbidity measurements
  - Purging rate, including any changes in rate
  - Drawdown in the well
- 3. IN-PLACE PLUMBING SOURCES INCLUDING DRINKING WATER SYSTEMS
  - 3.1. Record the following for all samples:
    - Plumbing and tap material construction (if known)
    - Flow rate at which well was purged
    - Amount of time well was allowed to purge
    - Flow rate at time of sample collection
    - Public water system identification number (if applicable)
    - Name and address of water supply system and an emergency phone number for notification of sample results (if applicable)
- 4. SURFACE WATER SAMPLING
  - Sample collection depth

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- Beginning and ending times (24 hr) for timed composite sampling
- Type of composite (e.g., flow-proportioned, continuous, etc.)
- 5. WASTEWATER SAMPLING
  - Beginning and ending times (24 hr) for timed composite sampling
  - Type of composite (e.g. flow-proportioned, continuous, etc.)

## FD 5200. Records for Non-Aqueous Environmental Samples

Document the following information for all samples when using the indicated procedures.

## FD 5210. DOCUMENTATION SPECIFIC TO SOIL SAMPLING (FS 3000)

- 1. GENERAL SOIL SAMPLING
  - Sample collection depth
  - Areal location of sample
  - Sample collection device
- 2. SAMPLING FOR VOLATILE ORGANIC COMPOUNDS (VOC) PER EPA METHOD 5035
  - Tare weight of VOC sample vial (if applicable)
  - Weight of sample (if applicable)

## FD 5220. DOCUMENTATION SPECIFIC TO SEDIMENT SAMPLING (FS 4000)

- 1. General Sediment Sampling
  - Sample collection depth
  - Areal location of sample
  - Sample collection device
- 2. SAMPLING FOR VOLATILE ORGANIC COMPOUNDS (VOC) PER EPA METHOD 5035
  - Tare weight of VOC sample vial (if applicable)
  - Weight of sample (if applicable)

## FD 5300. Documentation Specific To Waste Sampling (FS 5000)

- 1. DRUM SAMPLING
  - 1.1. Record the following information for each drum:

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- Type of drum and description of contents
- Drum number, if applicable
- Terrain and drainage condition
- Shape, size and dimensions of drum
- Label wording or other markings
- Dimensional extent of leaks or spills associated with the drum
- Drum location (or location map)
- 1.2. Record the following information for the drum sample(s):
- Description of phases, colors, crystals, powders, sludges, etc.
- Stratified layers sampled, including aliquot amounts for composites, if applicable
- 1.3. Record the following for field testing results on opened drums and drum samples:
  - Background readings for OVA meters
  - Sample readings for OVA meters
  - Type of OVA probe
  - Radiation background reading and sample radiation reading
  - Type of radiation monitor used
  - Oxygen and LEL readings from container opening
  - Water reactivity results
  - Specific gravity
  - PCB test results
  - Water solubility results
  - pH of aqueous wastes
  - Results of chemical test strips
  - Ignitability results
  - Results of other chemical hazard test kits
  - Miscellaneous comments for any tests
- 2. DOCUMENTATION FOR TANKS
  - 2.1. Record the following information for the tank:

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- Type of tank, tank design and material of construction of tank
- Description of tank contents and markings
- Tank number or other designation, if applicable
- Terrain and drainage condition
- Shape, size and dimensions of tank
- Label or placard wording or other markings
- Dimensional extent of leaks or spills associated with the tank
- Tank location (or location map)
- 2.2. Record the following information for the tank sample(s):
  - Description of phases, colors, crystals, powders, sludges, etc.
    - Stratified layers sampled, including aliquot amounts for composites, if applicable
- 2.3. Record the following for field testing results on opened tanks and tank samples:
  - Background readings for OVA meters
  - Sample readings for OVA meters
  - Type of OVA probe
  - Radiation background reading and sample radiation reading
  - Type of radiation monitor used
  - Oxygen and LEL level from container opening
  - Water reactivity results
  - Specific gravity
  - PCB test results
  - Water solubility results
  - pH of aqueous wastes
  - Results of chemical test strips
  - Ignitability results
  - Results of other chemical hazard test kits
  - Miscellaneous comments for any tests
- 3. DOCUMENTATION FOR WASTE LEACHATE AND WASTE SUMP SAMPLES
  - 3.1. Document information specific to leachate and sump sampling according to the documentation requirements for the respective FDEP SOPs employed to collect samples (FS 2100, FS 2200, FS 4000, FS 5100 and FS 5200).
- 4. DOCUMENTATION FOR WASTE PILE SAMPLES
  - 4.1. Document information specific to waste pile sampling according to associated regulatory requirements for the project.

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- 5. DOCUMENTATION FOR WASTE IMPOUNDMENT AND WASTE LAGOON SAMPLES
  - 5.1. Document information specific to impoundment and lagoon sampling according to the documentation requirements for the respective FDEP SOPs employed to collect samples (FS 2100, FS 4000, FS 5100 and FS 5200).

## FD 5400. Documentation For Biological Sampling

The following SOP sections list required documentation items for specific biological sampling procedures, as indicated.

# FD 5410. DOCUMENTATION FOR BIOLOGICAL AQUATIC HABITAT CHARACTERIZATION

Minimum documentation required for biological habitat characterization and sampling is listed below according to requirements as specified in the indicated sampling and field-testing FDEP SOPs.

# FD 5411. Physical/Chemical Characterization for Biological Sampling (FT 3001)

- 1. Record the following information or use the Physical/Chemical Characterization Field Sheet (Form FD 9000-3):
  - STORET station number
  - Sample date
  - Sample location
  - Field identification
  - Receiving body of water
  - Time of sampling
  - Percentage of land-use types in the watershed that drain to the site
  - Potential for erosion within the portion of the watershed that affects the site
  - Local non-point-source pollution
  - Width of 100-meter section of river or stream
  - Size of the system or the size of the sample area within the system (lake, wetland, or estuary)
  - Three measurements of water depth across the typical width transect
  - Three measurements of water velocity, one at each of the locations where water depth was measured
  - Vegetated riparian buffer zone width on each side of the stream or river or at the least buffered point of the lake, wetland or estuary
  - Presence of artificial channelization in the vicinity of the sampling location (stream or river)

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- Presence or absence of impoundments in the area of the sampling location
- Vertical distance from the current water level to the peak overflow level
- Distance of the high water mark above the stream bed
- Percentage range that best describes the degree of shading in the sampling area
- Any odors associated with the bottom sediments
- Presence or absence of oils in the sediment
- Any deposits in the area, including the degree of smothering by sand or silt
- Temperature
- pH
- Dissolved oxygen
- Specific conductance
- Salinity

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- Secchi depth
- Type of aquatic system sampled
- Description of any noticeable water odors
- Term that best describes the relative coverage of any oil on the water surface
- Term that best describes the amount of turbidity in the water
- Term that best describes the color of the water
- Weather conditions during the time of sampling
- Any other conditions/observations that may be helpful in characterizing the site
- Relative abundances of periphyton, fish, aquatic macrophytes and iron/sulfur bacteria
- Signature(s) of sampler(s)
- Sampling date
- 2. For streams and rivers, draw a grid sketch of the site (optionally use Form FD 9000-4), showing the location and amount of each substrate type (as observed by sight or touch). Using the grid sketch, count the number of grid spaces for each substrate type. Divide each of these numbers by the total number of grid spaces contained within the site sketch. Record this percent coverage value for each substrate type.
- 3. For lakes, divide the site map into twelve sections and note visual markers that may assist in distinguishing those sections.
- 4. Photographs of the sampling area are also useful tools for documenting habitat conditions and identifying station location.

# FD 5412. Stream and River Biological Habitat Assessment Records (FT 3100)

1. Record the following information or use Form FD 9000-5, Stream/River Habitat Assessment Field Sheet:

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- STORET station number
- Sampling date
- Sampling location
- Field identification
- · Receiving body of water
- Time of sampling upon arrival at the site
- 2. Additionally record the following:
  - Substrate diversity score
  - Substrate availability score
  - Water velocity score
  - Habitat smothering score
  - Artificial channelization score
  - Bank stability score for each bank
  - Riparian buffer zone width score for each bank
  - Riparian zone vegetation quality score for each bank
  - Primary habitat components score
  - Secondary habitat components score
  - Habitat assessment total score
  - Signatures
  - Assessment date

# FD 5413. Lake Biological Habitat Assessment Records (FT 3200)

- 1. Document the following information or use the Lake Habitat Assessment Field Sheet (Form FD 9000-6):
  - STORET station number
  - Sampling date
  - Sampling location
  - Field identification number
  - County name
  - Lake size
  - Features observed
  - Hydrology of the system (water residence time)
  - Color of the lake
  - Vegetation quality score

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- Stormwater inputs score
- Bottom substrate quality score
- Lakeside adverse human alterations score
- Upland buffer zone score
- Adverse watershed land use score
- Habitat assessment total score
- Signature and date

# FD 5420. BIOLOGICAL AQUATIC COMMUNITY SAMPLING RECORDS (FS 7000)

# FD 5421. Periphyton Sampling Records (FS 7200)

For each sample, record the following:

- Station sampled
- Date collected

# FD 5422. Qualitative Periphyton Sampling Records (FS 7210)

Complete the Physical/Chemical Characterization Field Sheet (Form FD 9000-3), Stream/River Habitat Sketch Sheet (Form FD 9000-4) or site map and Stream/River Habitat Assessment Field Sheet (Form FD 9000-5), as appropriate for the water body sampled (see FT 3000 – FT 3400). Other customized formats may be used to record the information prompted on the above forms.

# FD 5423. Rapid Bioassessment (Biorecon) Records (FS 7410)

Record the following information or use the Biorecon Field Sheet (Form FD 9000-1).

- Family or genus of all organisms from all material in all four dipnet sweeps
- Total taxa tallies
- Taxa richness, Florida Index and EPT Index scores
- Signatures
- Collection date

# FD 5424. Stream Condition Index (D-frame Dipnet) Sampling Records (FS 7420)

Complete the Physical/Chemical Characterization Field Sheet (Form FD 9000-3), Stream/River Habitat Sketch Sheet (Form FD 9000-4) or site map and Stream/River Habitat Assessment Field Sheet (Form FD 9000-5) forms appropriate for the water body sampled (see FT 3000 – FT 3400). Other customized formats may be used to record the information prompted on the above forms.

Record the following for each sample:

Number of sweeps for each habitat

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- Number of containers per sample
- FD 5425. Sediment Core Biological Grab Sampling Records (FS 7440)
  Record the sampling location of site grab core samples.
- FD 5426. Sediment Dredge Biological Grab Sampling Records (FS 7450)
  Record the sampling location of site grab dredge samples.
- FD 5427. Lake Condition Index (Lake Composite) Sediment Dredge Biological Grab Sampling Records (FS 7460)

Record the following:

- sampling location of site grab dredge sample
- sediment type(s) in each grab dredge sample

# FD 6000. (RESERVED)

# FD 7000. LEGAL OR EVIDENTIARY DOCUMENTATION

- 1. Scope: The use of legal or evidentiary Chain-of-Custody (COC) protocols are not required by DEP, except for cases involving civil or criminal enforcement. Do not use these procedures for routine sampling for compliance, for example, unless evidentiary custody protocols are specifically mandated in a permit or other legal order or when required for enforcement actions.
- 2. GENERAL PROCEDURAL INSTRUCTIONS
  - 2.1. Follow applicable requirements in FD 1000 FD 5000 for all evidence samples.
  - 2.2. Establish and maintain the evidentiary integrity of samples and/or sample containers. Demonstrate that the samples and/or sample containers were handled and transferred in such a manner as to eliminate possible tampering.
    - 2.2.1. Document and track all time periods and the physical possession and storage of sample containers and samples from point of origin through the final analytical result and sample disposal.

# FD 7100. General Requirements for Evidentiary Documentation

- 1. CHAIN OF CUSTODY RECORDS: Use the Chain-of-Custody (COC) records to establish an intact, contiguous record of the physical possession, storage and disposal of sample containers, collected samples, sample aliquots, and sample extracts or digestates. For ease of discussion, the above-mentioned items are referred to as "samples".
  - 1.1. Account for all time periods associated with the physical samples.
  - 1.2. Include signatures of all individuals who physically handle the samples.
    - 1.2.1. The signature of any individual on any record that is designated as part of the Chain-of-Custody is their assertion that they personally handled or processed the samples identified on the record.

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- 1.2.2. Denote each signature with a short statement that describes the activity of the signatory (e.g., "sampled by", "received by", "relinquished by", etc.).
- 1.2.3. In order to simplify recordkeeping, minimize the number of people who physically handle the samples.
- 2. Consolidation of Records: The COC records need not be limited to a single form or document. However, limit the number of documents required to establish COC, where practical, by grouping information for related activities in a single record. For example, a sample transmittal form may contain both certain field information and the necessary transfer information and signatures for establishing delivery and receipt at the laboratory.
- 3. LIABILITY FOR CUSTODY DOCUMENTATION: Ensure appropriate personnel initiate and maintain sample chain-of-custody at specified times.
  - 3.1. Begin legal chain-of-custody when the precleaned sample containers are dispatched to the field.
    - 3.1.1. Omit the transmittal record for precleaned sample containers if the same party provides the containers and collects the samples.
  - 3.2. Sign the COC record upon relinquishing the prepared sample kits or containers.
  - 3.3. Sign the COC record upon receipt of the sample kits or containers.
  - 3.4. Thereafter, ensure that all parties handling the samples maintain sample custody (i.e., relinquishing and receiving) and documentation until the samples or sampling kits are relinquished to a common carrier.
    - 3.4.1. The common carrier should not sign COC forms.
    - 3.4.2. Indicate the name of the common carrier in the COC record, when used. Retain shipping bills and related documents as part of the record.
    - 3.4.3. Ensure that all other transferors and transferees releasing or accepting materials from the common carrier sign the custody record.
  - 3.5. Chain-of-custody is relinquished by the party who seals the shipping container and is accepted by the party who opens it.
    - 3.5.1. Indicate the date and time of sealing of the transport container for shipment.
      - 3.5.1.1. See FD 7200, section 3 below regarding the use of custody seals.
- 4. SAMPLE SHIPPING OR TRANSPORTING
  - 4.1. Affix tamper-indicating custody seals or evidence tape before shipping samples.
    - 4.1.1. Seal sample container caps with tamper-indicating custody seals or evidence tape before packing for shipping or transport.
    - 4.1.2. Seal sample transport or shipping containers with strapping tape and tamper-indicating custody seals or evidence tape.
    - 4.1.3. If the same party collects then possesses (or securely stores), packs and transports the samples from time of collection, omit any use of custody seals or evidence tape.
  - 4.2. Keep the COC forms with the samples during transport or shipment. Place the COC records in a waterproof closure inside the sealed ice chest or shipping container.

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# FD 7200. Required Documentation for Evidentiary Custody

- 1. GENERAL CONTENT REQUIREMENTS: Document the following in COC tracking records by direct entry or linkage to other records:
  - Time of day and calendar date of each transfer or handling procedure
  - Signatures of transferors, transferees and other personnel handling samples
  - Location of samples (if stored in a secured area)
  - Description of all handling procedures performed on the samples for each time and date entry recorded above
  - Storage conditions for the samples, including chemical preservation and refrigeration or other cooling
  - Unique identification for all samples
  - Final disposition of the physical samples
  - Common carrier identity and related shipping documents
- 2. DOCUMENTATION CONTENT FOR SAMPLE TRANSMITTAL

Provide a Chain-of-Custody record for all evidentiary samples and subsamples that are transmitted or received by any party. Include the following information in the COC record of transmittal:

- Sampling site name and address
- Date and time of sample collection
- Unique field identification code for each sample source and each sample container
- Names of personnel collecting samples
- Signatures of all transferors and transferees
- Time of day and calendar date of all custody transfers
- Clear indication of number of sample containers
- Required analyses by approved method number or other description
- Common carrier usage
- Sample container/preservation kit documentation, if applicable
- 3. CHAIN-OF-CUSTODY SEALS: If required, affix tamper-indicating evidence tape or seals to all sample, storage and shipping container closures when transferring or shipping sample container kits or samples to another party.
  - 3.1. Place the seal so that the closure cannot be opened without breaking the seal.
  - 3.2. Record the time, calendar date and signatures of responsible personnel affixing and breaking all seals for each sample container and shipping container.
  - 3.3. Affix new seals every time a seal is broken until continuation of evidentiary custody is no longer required.

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# FD 7300. Documenting Controlled Access to Evidence Samples

Control and document access to all evidentiary samples and subsamples.

- 1. Limit the number of individuals who physically handle the samples as much as practicable.
- 2. When storing samples and subsamples, place samples in locked storage (e.g., locked vehicle, locked storeroom, etc.) at all times when not in the possession or view of authorized personnel.
- 3. Alternatively, maintain restricted access to facilities where samples are stored. Ensure that unauthorized personnel are not able to gain access to the samples at any time.
- 4. Do not leave samples in unoccupied motel or hotel rooms or other areas where access cannot be controlled by person(s) responsible for custody without first securing samples and shipping or storage containers with tamper-indicating evidence tape or custody seals.

# FD 7400. Documenting Disposal of Evidence Samples

- 1. Dispose of the physical samples only with the concurrence of the affected legal authority, sample data user and/or submitter/owner of the samples.
- 2. Record all conditions of disposal and retain correspondence between all parties concerning the final disposition of the physical samples.
- 3. Record the date of disposal, the nature of disposal (i.e., sample depleted, sample flushed into sewer, sample returned to client, etc.), and the name of the individual who performed the disposal. If samples are transferred to another party, document custody transfer in the same manner as other transfers (see FD 7000 FD 7200).

## FD 8000. REFERENCES

- 1. Florida Department of Environmental Protection, <u>Standard Operating Procedures for Laboratory Operations and Sample Collection, Chapter 5.0, "Sample Custody and Documentation"</u>, DEP-QA-001/92, September 30, 1992.
- 2. National Environmental Laboratory Accreditation Conference, <u>Constitution</u>, <u>Bylaws and Standards</u>, "<u>Quality Systems</u>", Section 5.12, EPA 600/R-99/068, July 1999.
- 3. U.S. Environmental Protection Agency, <u>Good Automated Laboratory Practices</u>, EPA 2185, 8/10/95

## FD 9000. FORMS

Use the following DEP SOP Forms to facilitate documentation of sampling, field-testing and biological laboratory calculation activities. These forms are for unrestricted public use and are suggestive in format. The use of these forms is not mandatory. However, the data elements and other information denoted by the form prompts comprise required documentation items. Customize these forms as needed. These forms are available as separate document files. The respective FDEP SOPs for which they are intended are also listed below.

- Form FD 9000-1 Biorecon Field Sheet (FS 7000 and LT 7000)
- Form FD 9000-2 Composite Lake Sampling Sheet (FS 7000)
- Form FD 9000-3 Physical/Chemical Characterization Field Sheet (FT 3000)

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- Form FD 9000-4 Stream/River Habitat Sketch Sheet (FT 3000)
- Form FD 9000-5 Stream/River Habitat Assessment Field Sheet (FT 3000)
- Form FD 9000-6 Lake Habitat Assessment Field Sheet (FT 3000)
- Form FD 9000-7 Field Measurements Record Form (FT 1100 FT 2400)
- Form FD 9000-8 Field Instrument Calibration Form (FT 1100 FT 2400)
- Form FD 9000-9 Field Instrument Maintenance Form (FT 1100 FT 2400)
- Form FD 9000-10 LI-COR Data Sheet for Transparency Measurements (FT 1700)
- Form FD 9000-11 Discharge Measurement Notes [USGS Form, 1971] (FT 1800)
- Form FD 9000-12 Maintenance and Calibration Log for Residual Chlorine Spectrophotometer (FT 2000)
- Form FD 9000-13 Field Calibration Check Log Form for Residual Chlorine (FT 2000)
- Form FD 9000-14 Gel Standard Calibration Log Form (FT 2000)
- Form FD 9000-15 Sediment Oxygen Demand Field Record Form (FT 2300)
- Form FD 9000-16 Chain-of-Custody Form for Tissues (FS 6000-FS 6200)
- Form FD 9000-17 Sample Request Form for Tissues (FS 6000-FS 6200)
- Form FD 9000-18 Field Record for Shellfish Contaminant Monitoring Program -Screening Study (FS 6100)
- Form FD 9000-19 Field Record for Shellfish Contaminant Monitoring Program Intensive Study (FS 6100)
- Form FD 9000-20 Field Record for Fish Contaminant Monitoring Program Screening Study (FS 6200)
- Form FD 9000-21 Field Record for Fish Contaminant Monitoring Program Intensive Study (FS 6200)
- Form FD 9000-22 Field Equipment Checklist- General Field Support (FS 1000)
- Form FD 9000-23 Field Equipment Checklist- Sample Collection (FS 1000)
- Form FD 9000-24 Groundwater Sampling Log (FS 2200)

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# BROWNFIELDS ASSESSMENT. OCALA, FLORIDA FOIA 2019-003937

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# APPENDIX I-3 FD 1000 - DOCUMENTATION PROCEDURES

# FD 1000. DOCUMENTATION PROCEDURES

- 1. INTRODUCTION: For the creation of unequivocal, accurate and methodical records to document all field activities affecting sample data, implement the following standard operating procedures for sample collection, sample handling and field-testing activities.
- 2. SCOPE AND APPLICABILITY
  - 2.1. This SOP provides a detailed listing of the information required for documentation of all sampling procedures and field testing.
  - 2.2. Refer to the associated sampling or field testing SOP for any requirements for the chronological or sequential documentation of data.
- 3. QUALITY ASSURANCE: Implement review procedures to monitor and verify accurate manual and automated data entry and recordkeeping for all documentation tasks outlined in this SOP.

# FD 1100. Universal Documentation Requirements

Incorporate efficient archival design and succinct documentation schemes for all record systems. Ensure that the history of a sample is clearly evident in the retained records and documentation and can be independently reconstructed.

- 1. CRITERIA FOR ALL DOCUMENTS
  - 1.1. Keep all applicable documentation available for inspection. Keep all original data and records as well as reduced or manipulated forms of the original data or records.
    - 1.1.1. Authorized representatives of FDEP may legally inspect and request copies of any records using paper, electronic digital media or other media during any FDEP audit of physical facilities or on-site sampling events, and for any data validations conducted for applicable project data submitted to FDEP.
  - 1.2. Record enough information so that clarifications, interpretations or explanations of the data are not required from the originator of the documentation.
  - 1.3. Clearly indicate the nature and intent of all documentation and all record entries.
  - 1.4. Link citations to SOPs and other documents by the complete name, reference or publication number, revision number and revision date for the cited document, when applicable. Also assign this information to internally generated SOPs.
  - 1.5. Retain copies of all revisions of all cited documents as part of the documentation archives.

#### 2. PROCEDURES

- 2.1. Sign, initial or encode all documentation entries made to paper, digital/electronic or other records with a link indicating the name and responsibility of the author making the data entry, clearly indicating the reason for the signature, initials or code (e.g., "sampled by"; "released by"; "prepared by"; "reviewed by").
- 2.2. In order to abbreviate record entries, make references to procedures written in internal SOPs or methodology and procedures promulgated by external sources.

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- 2.2.1. Document the intent to use SOPs other than the FDEP SOPs, or to use allowable modifications to the FDEP SOPs by recording the effective date of use for all such SOPs or modifications.
  - 2.2.1.1. Retain any correspondence with FDEP regarding approval to use alternative procedures for any projects.
- 2.2.2. Authorize all internal SOPs with the signatures of the quality assurance officer(s) and manager(s) responsible for implementation of the SOPs. Record the dates of signature.
- 2.3. Employ straightforward archiving of records to facilitate documentation tracking and retrieval of all current and archived records for purposes of inspection, verification and historical reconstruction of all procedures and measurement data.
- 2.4. Keep copies or originals of all documentation, including documentation sent to or received from external parties.
- 2.5. Use waterproof ink for all paper documentation.
- 2.6. Do not erase or obliterate entry errors on paper records. Make corrections by marking a line through the error so that it is still legible. Initial or sign the marked error and its correction.
- 2.7. Maintain electronic audit trails for all edited electronic digital records, if possible. Utilize software that allows tracking of users and data edits, if available. Software that prompts the user to double-check edits before execution is also preferred. See FD 1200.
- 2.8. Unequivocally link all documentation associated with a sample or measurement. Make cross-references to specific documentation when necessary.
- 2.9. Link final reports, data summaries or other condensed versions of data to the original sample data, including those prepared by external parties.
- 3. RETENTION REQUIREMENTS
  - 3.1. Per the FDEP QA Rule, 62-160.220 & .340, F.A.C., keep all documentation archives for a minimum of 5 years after the date of project completion or permit cycle unless otherwise specified in a Department contract, order, permit or Title 62 rules.

# FD 1200. Electronic and Digital Documentation

Handle electronic digital data as with any data according to applicable provisions of FD 1100.

- 1. RETENTION OF AUTOMATIC DATA RECORDING PRODUCTS
  - 1.1. For data not directly read from the instrument display and manually recorded, retain all products or outputs from automatic data recording devices, such as strip chart recorders, integrators, data loggers, field measurement devices, computers, etc. Store records in electronic, magnetic, optical or paper form, as necessary.
    - 1.1.1. Retain all original, raw output data. Ensure archiving of these data prior to subsequent reduction or other manipulation of the data.
  - 1.2. Identify output records as to purpose, analysis date and time, field sample identification number, etc. Maintain unequivocal linkage with the associated sample, other data source or measured medium and specific instrument used to make the measurement.
- 2. ELECTRONIC DIGITAL DATA SECURITY

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- 2.1. Control levels of access to electronic digital data systems as required to maintain system security and prevent unauthorized editing of data.
- 2.2. Do not alter raw instrumentation data or original manual data records in any fashion without retention of the original raw data.
- 2.3. Maintain secure computer networks and appropriate virus protection as warranted for each system design.
- 3. ELECTRONIC DATA STORAGE AND DOCUMENTATION
  - 3.1. Store all electronic, magnetic and optical media for easy retrieval of records.
    - 3.1.1. Ensure that all records can be printed to paper if needed for audit or verification purposes.
    - 3.1.2. If it is anticipated that the documentation archive will become unreadable due to obsolescence of a particular storage technology, retain a paper archive of the data or transfer to other suitable media.
  - 3.2. For easy retrieval of records, link all stored data to the associated sample data or other data source.
  - 3.3. Back up all data at a copy rate commensurate with the level of vulnerability of the data. Consider replicating all original data as soon as possible after origination.
- 4. SOFTWARE VERIFICATION
  - 4.1. Ensure that any software used to perform automatic calculations conforms to required formulas or protocols.
  - 4.2. Document all software problems and their resolution in detail, where these problems have irretrievably affected data records or linkage. Record the calendar date, time, responsible personnel and relevant technical details of all affected data and software files. Note all software changes, updates, installations, etc. per the above concerns. File and link all associated service records supplied by vendors or other service personnel.
- 5. PROTECTION OF EQUIPMENT AND STORAGE MEDIA
  - 5.1. Place stationary computers, instrumentation and peripheral devices in locations of controlled temperature and humidity and away from areas where the potential for fluid leaks, fire, falling objects or other hazards may exist. In the field, protect portable equipment from weather, excess heat or freezing, storage in closed vehicles, spillage from reagents and samples, etc.
  - 5.2. Protect storage media from deteriorating conditions such as temperature, humidity, magnetic fields or other environmental hazards as above.

# FD 1300. Documentation Using Other Media

- 1. UNIVERSAL REQUIREMENTS
  - 1.1. Handle documentation prepared using other media according to FD 1100.
- 2. PROTECTION OF STORED MEDIA
  - 2.1. Store media such as photographs, photographic negatives, microfilm, videotape, etc. under conditions generally prescribed for these media by manufacturers and conducive to long-term storage and protection from deterioration. See also FD 1200, section 5, above.

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# FD 2000. DOCUMENTATION OF CLEANED EQUIPMENT, SAMPLE CONTAINERS, REAGENTS AND SUPPLIES

When providing sample containers, preservation reagents, analyte-free water or sampling equipment, document certain aspects of these preparations.

#### 1. EQUIPMENT CLEANING DOCUMENTATION

- 1.1. Document all cleaning procedures by stepwise description in an internal SOP if cleaning procedures in the FDEP SOP have been modified for use.
- 1.2. Retain any certificates of cleanliness issued by vendors supplying cleaned equipment or sample containers.
- 1.3. If items are cleaned in the field during sampling activities for a site, document the date and time when the affected equipment was cleaned.

#### 2. SAMPLING KIT DOCUMENTATION

Transmit to the recipient the following information pertaining to sampling equipment or other implements, sample containers, reagent containers, analyte-free water containers, reagents or analyte-free water supplied to the recipient.

- Quantity, description and material composition of all containers, container closures or closure liners
- Intended application for each sample container type indicated by approved analytical method or analyte group(s)
- Type and concentration of preservative added to clean sample containers and/or shipped as additional preservative
- Intended use of any additional preservatives or reagents
- Description of any analyte-free water (i.e., deionized, organic-free, etc.)
- Date of analyte-free water containerization
- Date of sampling kit preparation
- Description and material composition of all reagent transfer implements (e.g., pipets) shipped in the sampling kit
- Intended use of all implements
- Quantity, description and material composition of all sampling equipment
- Tare weight of VOC vials, as applicable (this item may be necessary in cases where EPA 5035 VOC sample vials are provided by a third party supplier)

#### 3. DOCUMENTATION FOR REAGENTS AND OTHER CHEMICALS

3.1. Keep a record of the lot numbers and inclusive dates of use for all reagents, detergents, solvents and other chemicals used for cleaning, field testing and sample preservation.

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# FD 3000. DOCUMENTATION OF EQUIPMENT MAINTENANCE

- 1. Log all maintenance and repair performed for each instrument unit, including routine cleaning procedures and solution or parts replacement for instrument probes.
  - Include the calendar date for the procedures performed.
  - 1.2. Record names of personnel performing the maintenance or repair tasks.
    - 1.2.1. Describe any malfunctions necessitating repair or service.
  - 1.3. Designate the identity of specific instrumentation in the documentation with a unique description or code for each instrument unit employed. This may include a manufacturer name, model number, serial number, inventory number, etc.
- 2. Retain vendor service records for all affected instruments.
- 3. Record the following for rented equipment:
  - Rental date(s)
  - Equipment type and model or inventory number or other description
- 4. Retain the manufacturer's operating and maintenance instructions.

# FD 4000. DOCUMENTATION FOR CALIBRATION OF FIELD-TESTING INSTRUMENTS AND FIELD ANALYSES

Document acceptable instrument or measuring system calibration for each field test or analysis of a sample or other measurement medium.

# FD 4100. General Documentation for all Field Testing

- 1. Link standard preparation and working standards to intermediate and primary standards used in all calibrations.
  - 1.1. Record the concentration or other value for the standard in the appropriate measurement units.
    - 1.1.1. Note vendor catalog number and description for preformulated solutions as well as for neat liquids and powdered standards.
    - 1.1.2. Retain vendor assay specifications for standards as part of the calibration record.
      - 1.1.2.1. Record the grade of standard used.
  - 1.2. When formulated in-house, document all calculations used to formulate calibration standards.
    - 1.2.1. Record the date of preparation for all in-house formulations.
  - 1.3. Record expiration dates for all calibration standards.
    - 1.3.1. Document acceptable assay or calibration response or verification of any standard used after an expiration date.
  - 1.4. Describe or cite the procedure(s) used to prepare any standards in-house (FDEP SOP or internal SOP).

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- 2. Document acceptable calibration and calibration verification for each instrument unit and field test or analysis, linking this record with affected sample measurements. Retain vendor certifications of all factory-calibrated instrumentation.
  - 2.1. Designate the identity of specific instrumentation in the documentation with a unique description or code for each instrument unit employed.
    - 2.1.1. Record manufacturer name, model number and identifying number such as a serial number for each instrument unit.
  - 2.2. Record the time and date of all calibrations, calibration checks and verifications.
    - 2.2.1. Record the result (value in appropriate measurement units) of all calibrations, calibration checks and verifications.
  - 2.3. Record the name of the analyst(s) performing the calibration.
  - 2.4. Document the specific standards used to calibrate or check (verify) the instrument or field test.
  - 2.5. Specify the calibration acceptance criteria and the calibration check or verification acceptance criteria for each instrument unit and field test or analysis.
    - 2.5.1. Retain manufacturers' instrument specifications or acceptable recoveries specified by QC check sample suppliers as part of the calibration record, if these data are used as calibration acceptance criteria. Link these records to the affected samples, instrument unit and field test.
    - 2.5.2. Document the result(s) indicating that successful calibration acceptance occurred.
    - 2.5.3. Document the result(s) indicating whether the calibration check or verification passed or failed.
  - 2.6. Document any corrective actions taken prior to recalibration after a failed check or verification.
    - 2.6.1. Note any incidence of discontinuation of use of the instrument due to calibration failure.
  - 2.7. Describe or cite the specific calibration or check procedure performed (FDEP SOP or internal SOP).

# FD 5000. DOCUMENTATION OF SAMPLE COLLECTION, PRESERVATION AND TRANSPORT

Follow these procedures for all samples. See FD 5100 - FD 5427 below for additional documentation for specific sampling activities. See example Forms in FD 9000, below for additional documentation requirements for specific sampling and testing procedures.

1. SAMPLE IDENTIFICATION REQUIREMENTS

. . . .

- 1.1. Label or tag each sample container with a unique field identification code that distinguishes each sample container from all others.
  - 1.1.1. Link the unique field identification code to the sample source or sampling point identification, the analytes of interest, the preservation technique and sample replicate

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sequence. Make sure the code is different from codes assigned to any other sample containers.

- 1.2. Attach the label or tag so that it does not contact any portion of the sample that is removed or poured from the container.
- 1.3. Record the unique field identification code on all other documentation associated with the specific sample container.
- 2. GENERAL REQUIREMENTS FOR SAMPLING DOCUMENTATION: Record the following information for all sampling.
  - 2.1. Names of all sampling team personnel on site during sampling
  - 2.2. Date and time of sample collection (indicate hours and minutes)
    - 2.2.1. Use 24-hour clock time or indicate A.M. and P.M.
    - 2.2.2. Note the exact time of collection for individual sample containers for time-sensitive analyses of less than 24 hours maximum holding time.
  - 2.3. Ambient field conditions, to include, but not limited to information such as weather, tides, etc.
  - 2.4. Specific description of sample location including site name and address
    - 2.4.1. Describe the specific sampling point (e.g., monitoring well identification number, outfall number, station number, etc.).
    - 2.4.2. Determine latitude and longitude of sampling source location using GPS (if available)
    - 2.4.3. Locate sampling points on scaled maps or drawings where applicable.
  - 2.5. Unique field identification code for each sample container and parameters to be analyzed
  - 2.6. Matrix sampled
  - 2.7. Field-testing measurement data, to include the following:
    - Project name
    - Date and time of measurement or test
    - Source and location of the measurement or test sample (e.g., monitoring well identification number, outfall number, station number or other description)
    - Latitude and longitude of sampling source location determined by GPS (if available)
    - Analyte or parameter measured
    - Measurement or test sample value in appropriate reporting units
    - Analyst(s) performing the measurement(s) or test(s)
    - Unique identification of the specific instrument unit(s) used for the test(s)
  - 2.8. Calibration records for field-testing equipment
    - 2.8.1. See FD 4000 above for specific details.

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- 2.9. Preservation for each container
  - 2.9.1. See FD 5100, section 4 below.
- 2.10. Purging and sampling equipment used
- 2.11. Types, number, collection location and collection sequence of quality control samples
- 2.12. Use of fuel powered vehicles and equipment
- 2.13. Number of subsamples and amount of each subsample in any composite samples
  - 2.13.1. Include sufficient location information for the composite subsamples per 2.4 above.
- 2.14. Signature(s) or initials of sampler(s)
- 3. SAMPLE TRANSMITTAL RECORDS: Transmit the following information to the analytical laboratory or other receiving party. Link transmittal records with a given project and retain all transmittal records.
  - 3.1. Site name and address
    - 3.1.1. Client code is acceptable if samples are considered sensitive information and if the field records clearly trace the code to a specified site and address.
  - 3.2. Date and time of sample collection
  - 3.3. Name of sampler responsible for sample transmittal
  - 3.4. Unique field identification codes for each sample container
  - 3.5. Total number of samples
  - 3.6. Required analyses
  - 3.7. Preservation protocol
  - 3.8. Comments about sample or sample conditions
  - 3.9. Identification of common carrier (if used)
- 4. SAMPLE TRANSPORT
  - 4.1. If shipping transmittal forms in the transport containers with the samples, place the forms in a waterproof enclosure and seal.
  - 4.2. For common carrier shipping, seal transport containers securely with strapping tape or other means to prevent lids from accidentally opening.
    - 4.2.1. Keep all shipping bills from common carriers with archived transmittal records.
- 5. ANCILLARY FIELD RECORDS: Link any miscellaneous or ancillary records (photographs, videotapes, maps, etc.) to specific sampling events such that these records are easily traceable in the data archives associated with the project, sampling date and sample source(s).

# FD 5100. Documentation Specific To Aqueous Chemistry Sampling

- 1. SAMPLE PRESERVATION: Record the following for all samples:
  - 1.1. Chemical preservative name(s)
  - 1.2. pH verification (if applicable)

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- 1.3. Amount/quantity of preservative added to sample or amount/quantity of additional preservative added (if using sample containers with premeasured preservatives)
  - 1.3.1. For documentation of preservation for routine samples, defer to SOPs for this information.
  - 1.3.2. Record instances of deviation from preservation protocols found in SOPs for non-routine or problematic samples.
- 1.4. Use of ice or other cooling method, if applicable.
- 2. GROUNDWATER SAMPLING
  - 2.1. Record the following for all samples. See section 3 below for in-place plumbing:
    - Purging equipment used
    - Well casing composition and diameter of well casing
    - Water table depth and well depth
    - Calculations used to determine purge volume
    - Total amount of water purged
    - Date well was purged
    - Sampling equipment used
    - Well diameter
    - Total depth of well
    - Depth to groundwater
    - Volume of water in the well
    - · Purging method
    - Times for beginning and ending of purging
    - Total volume purged
    - Times of stabilization parameter measurements
    - Purging rate, including any changes in rate
    - Temperature measurements
    - pH measurements
    - Specific conductance measurements
    - Dissolved oxygen measurements
    - Turbidity measurements
    - Site or monitor well conditions impacting observed dissolved oxygen and turbidity measurements
    - Color of groundwater
    - Odor of groundwater
  - 2.2. Record the following for Water Level and Purge Volume Determination (FS 2211):

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- Depth to groundwater
- Total depth of well
- Length of water column
- Well diameter
- Volume of water in the well
- Volume of pump
- Tubing diameter
- Length of tubing
- Volume of flow cell
- Volume in the pumping system
- 2.3. Record the following for Well Purging (FS 2212)
  - Calculations for pumping rates, including any changes in rates
  - Flow meter readings
  - Volume of water purged
  - Time needed to purge one (1) well volume or purging equipment volume
  - Well volumes or purging equipment volumes purged
  - Temperature measurements
  - pH measurements
  - Specific conductance measurements
  - Dissolved oxygen measurements
  - Turbidity measurements
  - Purging rate, including any changes in rate
  - Drawdown in the well
- 3. IN-PLACE PLUMBING SOURCES INCLUDING DRINKING WATER SYSTEMS
  - 3.1. Record the following for all samples:
    - Plumbing and tap material construction (if known)
    - Flow rate at which well was purged
    - Amount of time well was allowed to purge
    - Flow rate at time of sample collection
    - Public water system identification number (if applicable)
    - Name and address of water supply system and an emergency phone number for notification of sample results (if applicable)
- 4. SURFACE WATER SAMPLING
  - Sample collection depth

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- Beginning and ending times (24 hr) for timed composite sampling
- Type of composite (e.g., flow-proportioned, continuous, etc.)
- 5. WASTEWATER SAMPLING
  - Beginning and ending times (24 hr) for timed composite sampling
  - Type of composite (e.g. flow-proportioned, continuous, etc.)

# FD 5200. Records for Non-Aqueous Environmental Samples

Document the following information for all samples when using the indicated procedures.

# FD 5210. DOCUMENTATION SPECIFIC TO SOIL SAMPLING (FS 3000)

- 1. GENERAL SOIL SAMPLING
  - Sample collection depth
  - Areal location of sample
  - Sample collection device
- 2. SAMPLING FOR VOLATILE ORGANIC COMPOUNDS (VOC) PER EPA METHOD 5035
  - Tare weight of VOC sample vial (if applicable)
  - Weight of sample (if applicable)

# FD 5220. DOCUMENTATION SPECIFIC TO SEDIMENT SAMPLING (FS 4000)

- 1. General Sediment Sampling
  - Sample collection depth
  - Areal location of sample
  - Sample collection device
- 2. SAMPLING FOR VOLATILE ORGANIC COMPOUNDS (VOC) PER EPA METHOD 5035
  - Tare weight of VOC sample vial (if applicable)
  - Weight of sample (if applicable)

# FD 5300. Documentation Specific To Waste Sampling (FS 5000)

- 1. DRUM SAMPLING
  - 1.1. Record the following information for each drum:

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- Type of drum and description of contents
- Drum number, if applicable
- Terrain and drainage condition
- Shape, size and dimensions of drum
- Label wording or other markings
- Dimensional extent of leaks or spills associated with the drum
- Drum location (or location map)
- 1.2. Record the following information for the drum sample(s):
- Description of phases, colors, crystals, powders, sludges, etc.
- Stratified layers sampled, including aliquot amounts for composites, if applicable
- 1.3. Record the following for field testing results on opened drums and drum samples:
  - Background readings for OVA meters
  - Sample readings for OVA meters
  - Type of OVA probe
  - Radiation background reading and sample radiation reading
  - Type of radiation monitor used
  - Oxygen and LEL readings from container opening
  - Water reactivity results
  - Specific gravity
  - PCB test results
  - Water solubility results
  - pH of aqueous wastes
  - Results of chemical test strips
  - Ignitability results
  - Results of other chemical hazard test kits
  - Miscellaneous comments for any tests
- 2. DOCUMENTATION FOR TANKS
  - 2.1. Record the following information for the tank:

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- Type of tank, tank design and material of construction of tank
- Description of tank contents and markings
- Tank number or other designation, if applicable
- Terrain and drainage condition
- Shape, size and dimensions of tank
- Label or placard wording or other markings
- Dimensional extent of leaks or spills associated with the tank
- Tank location (or location map)
- 2.2. Record the following information for the tank sample(s):
  - Description of phases, colors, crystals, powders, sludges, etc.
    - Stratified layers sampled, including aliquot amounts for composites, if applicable
- 2.3. Record the following for field testing results on opened tanks and tank samples:
  - Background readings for OVA meters
  - Sample readings for OVA meters
  - Type of OVA probe
  - Radiation background reading and sample radiation reading
  - Type of radiation monitor used
  - Oxygen and LEL level from container opening
  - Water reactivity results
  - Specific gravity
  - PCB test results
  - Water solubility results
  - pH of aqueous wastes
  - Results of chemical test strips
  - Ignitability results
  - Results of other chemical hazard test kits
  - Miscellaneous comments for any tests
- 3. DOCUMENTATION FOR WASTE LEACHATE AND WASTE SUMP SAMPLES
  - 3.1. Document information specific to leachate and sump sampling according to the documentation requirements for the respective FDEP SOPs employed to collect samples (FS 2100, FS 2200, FS 4000, FS 5100 and FS 5200).
- 4. DOCUMENTATION FOR WASTE PILE SAMPLES
  - 4.1. Document information specific to waste pile sampling according to associated regulatory requirements for the project.

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- 5. DOCUMENTATION FOR WASTE IMPOUNDMENT AND WASTE LAGOON SAMPLES
  - 5.1. Document information specific to impoundment and lagoon sampling according to the documentation requirements for the respective FDEP SOPs employed to collect samples (FS 2100, FS 4000, FS 5100 and FS 5200).

## FD 5400. Documentation For Biological Sampling

The following SOP sections list required documentation items for specific biological sampling procedures, as indicated.

# FD 5410. DOCUMENTATION FOR BIOLOGICAL AQUATIC HABITAT CHARACTERIZATION

Minimum documentation required for biological habitat characterization and sampling is listed below according to requirements as specified in the indicated sampling and field-testing FDEP SOPs.

# FD 5411. Physical/Chemical Characterization for Biological Sampling (FT 3001)

- 1. Record the following information or use the Physical/Chemical Characterization Field Sheet (Form FD 9000-3):
  - STORET station number
  - Sample date
  - Sample location
  - Field identification
  - Receiving body of water
  - Time of sampling
  - Percentage of land-use types in the watershed that drain to the site
  - Potential for erosion within the portion of the watershed that affects the site
  - Local non-point-source pollution
  - Width of 100-meter section of river or stream
  - Size of the system or the size of the sample area within the system (lake, wetland, or estuary)
  - Three measurements of water depth across the typical width transect
  - Three measurements of water velocity, one at each of the locations where water depth was measured
  - Vegetated riparian buffer zone width on each side of the stream or river or at the least buffered point of the lake, wetland or estuary
  - Presence of artificial channelization in the vicinity of the sampling location (stream or river)

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- Presence or absence of impoundments in the area of the sampling location
- Vertical distance from the current water level to the peak overflow level
- Distance of the high water mark above the stream bed
- Percentage range that best describes the degree of shading in the sampling area
- Any odors associated with the bottom sediments
- Presence or absence of oils in the sediment
- Any deposits in the area, including the degree of smothering by sand or silt
- Temperature
- pH
- Dissolved oxygen
- Specific conductance
- Salinity

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- Secchi depth
- Type of aquatic system sampled
- Description of any noticeable water odors
- Term that best describes the relative coverage of any oil on the water surface
- Term that best describes the amount of turbidity in the water
- Term that best describes the color of the water
- Weather conditions during the time of sampling
- Any other conditions/observations that may be helpful in characterizing the site
- Relative abundances of periphyton, fish, aquatic macrophytes and iron/sulfur bacteria
- Signature(s) of sampler(s)
- Sampling date
- 2. For streams and rivers, draw a grid sketch of the site (optionally use Form FD 9000-4), showing the location and amount of each substrate type (as observed by sight or touch). Using the grid sketch, count the number of grid spaces for each substrate type. Divide each of these numbers by the total number of grid spaces contained within the site sketch. Record this percent coverage value for each substrate type.
- 3. For lakes, divide the site map into twelve sections and note visual markers that may assist in distinguishing those sections.
- 4. Photographs of the sampling area are also useful tools for documenting habitat conditions and identifying station location.

#### FD 5412. Stream and River Biological Habitat Assessment Records (FT 3100)

1. Record the following information or use Form FD 9000-5, Stream/River Habitat Assessment Field Sheet:

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- STORET station number
- Sampling date
- Sampling location
- Field identification
- Receiving body of water
- Time of sampling upon arrival at the site
- 2. Additionally record the following:
  - Substrate diversity score
  - Substrate availability score
  - Water velocity score
  - Habitat smothering score
  - Artificial channelization score
  - Bank stability score for each bank
  - Riparian buffer zone width score for each bank
  - Riparian zone vegetation quality score for each bank
  - Primary habitat components score
  - Secondary habitat components score
  - Habitat assessment total score
  - Signatures
  - Assessment date

# FD 5413. Lake Biological Habitat Assessment Records (FT 3200)

- 1. Document the following information or use the Lake Habitat Assessment Field Sheet (Form FD 9000-6):
  - STORET station number
  - Sampling date
  - Sampling location
  - Field identification number
  - County name
  - Lake size
  - Features observed
  - Hydrology of the system (water residence time)
  - Color of the lake
  - Vegetation quality score

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- Stormwater inputs score
- Bottom substrate quality score
- Lakeside adverse human alterations score
- Upland buffer zone score
- Adverse watershed land use score
- Habitat assessment total score
- Signature and date

# FD 5420. BIOLOGICAL AQUATIC COMMUNITY SAMPLING RECORDS (FS 7000)

# FD 5421. Periphyton Sampling Records (FS 7200)

For each sample, record the following:

- Station sampled
- Date collected

# FD 5422. Qualitative Periphyton Sampling Records (FS 7210)

Complete the Physical/Chemical Characterization Field Sheet (Form FD 9000-3), Stream/River Habitat Sketch Sheet (Form FD 9000-4) or site map and Stream/River Habitat Assessment Field Sheet (Form FD 9000-5), as appropriate for the water body sampled (see FT 3000 – FT 3400). Other customized formats may be used to record the information prompted on the above forms.

# FD 5423. Rapid Bioassessment (Biorecon) Records (FS 7410)

Record the following information or use the Biorecon Field Sheet (Form FD 9000-1).

- Family or genus of all organisms from all material in all four dipnet sweeps
- Total taxa tallies
- Taxa richness, Florida Index and EPT Index scores
- Signatures
- Collection date

# FD 5424. Stream Condition Index (D-frame Dipnet) Sampling Records (FS 7420)

Complete the Physical/Chemical Characterization Field Sheet (Form FD 9000-3), Stream/River Habitat Sketch Sheet (Form FD 9000-4) or site map and Stream/River Habitat Assessment Field Sheet (Form FD 9000-5) forms appropriate for the water body sampled (see FT 3000 – FT 3400). Other customized formats may be used to record the information prompted on the above forms.

Record the following for each sample:

Number of sweeps for each habitat

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Number of containers per sample

# FD 5425. Sediment Core Biological Grab Sampling Records (FS 7440)

Record the sampling location of site grab core samples.

# FD 5426. Sediment Dredge Biological Grab Sampling Records (FS 7450)

Record the sampling location of site grab dredge samples.

# FD 5427. Lake Condition Index (Lake Composite) Sediment Dredge Biological Grab Sampling Records (FS 7460)

Record the following:

- sampling location of site grab dredge sample
- sediment type(s) in each grab dredge sample

# FD 6000. (RESERVED)

# FD 7000. LEGAL OR EVIDENTIARY DOCUMENTATION

- 1. Scope: The use of legal or evidentiary Chain-of-Custody (COC) protocols are not required by DEP, except for cases involving civil or criminal enforcement. Do not use these procedures for routine sampling for compliance, for example, unless evidentiary custody protocols are specifically mandated in a permit or other legal order or when required for enforcement actions.
- 2. GENERAL PROCEDURAL INSTRUCTIONS
  - 2.1. Follow applicable requirements in FD 1000 FD 5000 for all evidence samples.
  - 2.2. Establish and maintain the evidentiary integrity of samples and/or sample containers. Demonstrate that the samples and/or sample containers were handled and transferred in such a manner as to eliminate possible tampering.
    - 2.2.1. Document and track all time periods and the physical possession and storage of sample containers and samples from point of origin through the final analytical result and sample disposal.

# FD 7100. General Requirements for Evidentiary Documentation

- 1. CHAIN OF CUSTODY RECORDS: Use the Chain-of-Custody (COC) records to establish an intact, contiguous record of the physical possession, storage and disposal of sample containers, collected samples, sample aliquots, and sample extracts or digestates. For ease of discussion, the above-mentioned items are referred to as "samples".
  - 1.1. Account for all time periods associated with the physical samples.
  - 1.2. Include signatures of all individuals who physically handle the samples.
    - 1.2.1. The signature of any individual on any record that is designated as part of the Chain-of-Custody is their assertion that they personally handled or processed the samples identified on the record.

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- 1.2.2. Denote each signature with a short statement that describes the activity of the signatory (e.g., "sampled by", "received by", "relinquished by", etc.).
- 1.2.3. In order to simplify recordkeeping, minimize the number of people who physically handle the samples.
- 2. CONSOLIDATION OF RECORDS: The COC records need not be limited to a single form or document. However, limit the number of documents required to establish COC, where practical, by grouping information for related activities in a single record. For example, a sample transmittal form may contain both certain field information and the necessary transfer information and signatures for establishing delivery and receipt at the laboratory.
- 3. LIABILITY FOR CUSTODY DOCUMENTATION: Ensure appropriate personnel initiate and maintain sample chain-of-custody at specified times.
  - 3.1. Begin legal chain-of-custody when the precleaned sample containers are dispatched to the field.
    - 3.1.1. Omit the transmittal record for precleaned sample containers if the same party provides the containers and collects the samples.
  - 3.2. Sign the COC record upon relinquishing the prepared sample kits or containers.
  - 3.3. Sign the COC record upon receipt of the sample kits or containers.
  - 3.4. Thereafter, ensure that all parties handling the samples maintain sample custody (i.e., relinquishing and receiving) and documentation until the samples or sampling kits are relinquished to a common carrier.
    - 3.4.1. The common carrier should not sign COC forms.
    - 3.4.2. Indicate the name of the common carrier in the COC record, when used. Retain shipping bills and related documents as part of the record.
    - 3.4.3. Ensure that all other transferors and transferees releasing or accepting materials from the common carrier sign the custody record.
  - 3.5. Chain-of-custody is relinquished by the party who seals the shipping container and is accepted by the party who opens it.
    - 3.5.1. Indicate the date and time of sealing of the transport container for shipment.
      - 3.5.1.1. See FD 7200, section 3 below regarding the use of custody seals.
- 4. SAMPLE SHIPPING OR TRANSPORTING
  - 4.1. Affix tamper-indicating custody seals or evidence tape before shipping samples.
    - 4.1.1. Seal sample container caps with tamper-indicating custody seals or evidence tape before packing for shipping or transport.
    - 4.1.2. Seal sample transport or shipping containers with strapping tape and tamper-indicating custody seals or evidence tape.
    - 4.1.3. If the same party collects then possesses (or securely stores), packs and transports the samples from time of collection, omit any use of custody seals or evidence tape.
  - 4.2. Keep the COC forms with the samples during transport or shipment. Place the COC records in a waterproof closure inside the sealed ice chest or shipping container.

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## FD 7200. Required Documentation for Evidentiary Custody

- 1. GENERAL CONTENT REQUIREMENTS: Document the following in COC tracking records by direct entry or linkage to other records:
  - Time of day and calendar date of each transfer or handling procedure
  - Signatures of transferors, transferees and other personnel handling samples
  - Location of samples (if stored in a secured area)
  - Description of all handling procedures performed on the samples for each time and date entry recorded above
  - Storage conditions for the samples, including chemical preservation and refrigeration or other cooling
  - Unique identification for all samples
  - Final disposition of the physical samples
  - Common carrier identity and related shipping documents
- 2. DOCUMENTATION CONTENT FOR SAMPLE TRANSMITTAL

Provide a Chain-of-Custody record for all evidentiary samples and subsamples that are transmitted or received by any party. Include the following information in the COC record of transmittal:

- Sampling site name and address
- Date and time of sample collection
- Unique field identification code for each sample source and each sample container
- Names of personnel collecting samples
- Signatures of all transferors and transferees
- Time of day and calendar date of all custody transfers
- Clear indication of number of sample containers
- Required analyses by approved method number or other description
- Common carrier usage
- Sample container/preservation kit documentation, if applicable
- 3. CHAIN-OF-CUSTODY SEALS: If required, affix tamper-indicating evidence tape or seals to all sample, storage and shipping container closures when transferring or shipping sample container kits or samples to another party.
  - 3.1. Place the seal so that the closure cannot be opened without breaking the seal.
  - 3.2. Record the time, calendar date and signatures of responsible personnel affixing and breaking all seals for each sample container and shipping container.
  - 3.3. Affix new seals every time a seal is broken until continuation of evidentiary custody is no longer required.

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# FD 7300. Documenting Controlled Access to Evidence Samples

Control and document access to all evidentiary samples and subsamples.

- 1. Limit the number of individuals who physically handle the samples as much as practicable.
- 2. When storing samples and subsamples, place samples in locked storage (e.g., locked vehicle, locked storeroom, etc.) at all times when not in the possession or view of authorized personnel.
- 3. Alternatively, maintain restricted access to facilities where samples are stored. Ensure that unauthorized personnel are not able to gain access to the samples at any time.
- 4. Do not leave samples in unoccupied motel or hotel rooms or other areas where access cannot be controlled by person(s) responsible for custody without first securing samples and shipping or storage containers with tamper-indicating evidence tape or custody seals.

# FD 7400. Documenting Disposal of Evidence Samples

- 1. Dispose of the physical samples only with the concurrence of the affected legal authority, sample data user and/or submitter/owner of the samples.
- 2. Record all conditions of disposal and retain correspondence between all parties concerning the final disposition of the physical samples.
- 3. Record the date of disposal, the nature of disposal (i.e., sample depleted, sample flushed into sewer, sample returned to client, etc.), and the name of the individual who performed the disposal. If samples are transferred to another party, document custody transfer in the same manner as other transfers (see FD 7000 FD 7200).

# FD 8000. REFERENCES

- 1. Florida Department of Environmental Protection, <u>Standard Operating Procedures for Laboratory Operations and Sample Collection, Chapter 5.0, "Sample Custody and Documentation"</u>, DEP-QA-001/92, September 30, 1992.
- 2. National Environmental Laboratory Accreditation Conference, <u>Constitution</u>, <u>Bylaws and Standards</u>, "<u>Quality Systems</u>", Section 5.12, EPA 600/R-99/068, July 1999.
- 3. U.S. Environmental Protection Agency, <u>Good Automated Laboratory Practices</u>, EPA 2185, 8/10/95

# FD 9000. FORMS

Use the following DEP SOP Forms to facilitate documentation of sampling, field-testing and biological laboratory calculation activities. These forms are for unrestricted public use and are suggestive in format. The use of these forms is not mandatory. However, the data elements and other information denoted by the form prompts comprise required documentation items. Customize these forms as needed. These forms are available as separate document files. The respective FDEP SOPs for which they are intended are also listed below.

- Form FD 9000-1 Biorecon Field Sheet (FS 7000 and LT 7000)
- Form FD 9000-2 Composite Lake Sampling Sheet (FS 7000)
- Form FD 9000-3 Physical/Chemical Characterization Field Sheet (FT 3000)

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- Form FD 9000-4 Stream/River Habitat Sketch Sheet (FT 3000)
- Form FD 9000-5 Stream/River Habitat Assessment Field Sheet (FT 3000)
- Form FD 9000-6 Lake Habitat Assessment Field Sheet (FT 3000)
- Form FD 9000-7 Field Measurements Record Form (FT 1100 FT 2400)
- Form FD 9000-8 Field Instrument Calibration Form (FT 1100 FT 2400)
- Form FD 9000-9 Field Instrument Maintenance Form (FT 1100 FT 2400)
- Form FD 9000-10 LI-COR Data Sheet for Transparency Measurements (FT 1700)
- Form FD 9000-11 Discharge Measurement Notes [USGS Form, 1971] (FT 1800)
- Form FD 9000-12 Maintenance and Calibration Log for Residual Chlorine Spectrophotometer (FT 2000)
- Form FD 9000-13 Field Calibration Check Log Form for Residual Chlorine (FT 2000)
- Form FD 9000-14 Gel Standard Calibration Log Form (FT 2000)
- Form FD 9000-15 Sediment Oxygen Demand Field Record Form (FT 2300)
- Form FD 9000-16 Chain-of-Custody Form for Tissues (FS 6000-FS 6200)
- Form FD 9000-17 Sample Request Form for Tissues (FS 6000-FS 6200)
- Form FD 9000-18 Field Record for Shellfish Contaminant Monitoring Program -Screening Study (FS 6100)
- Form FD 9000-19 Field Record for Shellfish Contaminant Monitoring Program Intensive Study (FS 6100)
- Form FD 9000-20 Field Record for Fish Contaminant Monitoring Program Screening Study (FS 6200)
- Form FD 9000-21 Field Record for Fish Contaminant Monitoring Program Intensive Study (FS 6200)
- Form FD 9000-22 Field Equipment Checklist- General Field Support (FS 1000)
- Form FD 9000-23 Field Equipment Checklist- Sample Collection (FS 1000)
- Form FD 9000-24 Groundwater Sampling Log (FS 2200)

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# APPENDIX I-4 FQ 1000 - FIELD QUALITY CONTROL REQUIREMENTS

# FQ 1000. FIELD QUALITY CONTROL REQUIREMENTS

Field quality control measures monitor the sampling event to ensure that the collected samples are representative of the sample source and that the field-collected data have stated limits of precision and accuracy.

- 1. Field-collected blanks must demonstrate that the collected samples have not been contaminated by:
  - The sampling environment
  - The sampling equipment
  - The sample container
  - The sampling preservatives
  - Sample transport
  - Sample storage
- 2. Field Measurement Quality Controls must demonstrate that
  - The instrument was properly calibrated; and
  - The instrument maintained acceptable calibration during use.

### FQ 1100. Sample Containers

Sample containers must be free from contamination by the analytes of interest or any interfering constituents and must be compatible with the sample type.

## FQ 1200. Sampling Operations

- 1. When collected, analyze all quality control samples for the same parameters as the associated samples.
  - 1.1. When collected, collect blanks the following parameter groups and tests:
    - Volatile Organics
    - Extractable Organics
    - Metals
    - Ultratrace Metals
    - Inorganic Nonmetallics
    - Radionuclides
    - Petroleum Hydrocarbons and Oil & Grease
    - Volatile Inorganics
    - Aggregate Organics except Biochemical Oxygen Demand
  - 1.2. Blanks are not required for:

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# FQ 1000 Field Quality Control Requirements

- Microbiological (all types)
- Toxicity
- Field parameters such as pH, Specific Conductance, Residual Chlorine, Temperature, Light Penetration, Dissolved Oxygen, ORP and Salinity,
- Radon
- Algal Growth Potential
- Biological Community
- Physical and Aggregate Properties
- Biochemical Oxygen Demand
- 2. Preserve, transport, document and handle all quality control samples as if they were samples. Once collected, they must remain with the sample set until the laboratory has received them.
- 3. Prepare equipment blanks by rinsing the sampling equipment set with the appropriate type of analyte-free water and collecting the rinsate in appropriate sample containers (see FQ 1100).
- 4. Except for trip blanks, prepare all quality control samples on-site in the field.
  - 4.1. Do not prepare precleaned equipment in advance at the base of operations
  - 4.2. Do not prepare field-cleaned equipment blanks after leaving the sampling site.
- 5. Perform and document any field QC measures specified by the analytical method (such as trip blanks for volatile organics).

# FQ 1210. QUALITY CONTROL BLANKS

# FQ 1211. Precleaned Equipment Blanks

- 1. USE: Monitors on-site sampling environment, sampling equipment decontamination, sample container cleaning, the suitability of sample preservatives and analyte-free water, and sample transport and storage conditions.
- 2. Collect these blanks on sampling equipment that has been brought to the site precleaned and ready for use.
- 3. Collect these blanks before the equipment set has been used.

# FQ 1212. Field-Cleaned Equipment Blanks

- 1. USE: Monitors on-site sampling environment, sampling equipment decontamination, sample container cleaning, the suitability of sample preservatives and analyte-free water, and sample transport and storage conditions.
- 2. Collect these blanks using sampling equipment that has been cleaned in the field (i.e., between sampling points).

## FQ 1213. Trip Blanks

1. USE: Monitors sample container cleaning, the suitability of sample preservatives and analyte-free water, and both contain and sample transport and storage conditions.

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# FQ 1000 Field Quality Control Requirements

- 2. These blanks are applicable if samples are to be analyzed for volatile constituents (volatile organics, methyl mercury, etc.).
- 3. The organization that is providing the VOC vials must provide the trip blanks by filling one or more VOC vials with analyte-free water.
- 4. Place a set of trip blanks in each transport container used to ship/store empty VOC vials. They must remain with the VOC vials during the sampling episode and must be transported to the analyzing laboratory in the same shipping or transport container(s) as the VOC samples.
- 5. Trip blanks must be opened **only** by the laboratory after the blank and associated samples have been received for analysis.

#### FQ 1214. Field Blanks

- 1. USE: Monitors on-site sampling environment, sample container cleaning, the suitability of sample preservatives and analyte-free water, and sample transport and storage conditions.
- 2. Prepare field blanks by pouring analyte-free water into sample containers for each parameter set to be collected.
- 3. Field blanks are not required if equipment blanks (FQ 1211 or FQ 1212) are collected.

#### FQ 1220. FIELD DUPLICATES

- 1. USE: Designed to measure the variability in the sampling process.
- 2. GENERAL CONSIDERATIONS:
  - 2.1. Collect duplicates by **repeating** (simultaneously or in rapid succession) the entire sample acquisition technique that was used to obtain the first sample.
    - 2.1.1. Collect, preserve, transport and document duplicates in the same manner as the samples. These samples are not considered laboratory duplicates.
  - 2.2. If collected, analyze field duplicates for the same parameters as the associated samples.
  - 2.3. When possible, collect duplicate samples from sampling locations where contamination is present.

### FQ 1221. Water Duplicates

Collect water duplicates by sampling from successively collected volumes (i.e., samples from the next volume of sample water).

# FQ 1222. Soil Duplicates

Collect soil duplicates from the same sample source (i.e., soil from the same soil sampling device).

# FQ 1230. MANDATORY FIELD QUALITY CONTROLS

1. The respondent, permittee or contractor and the sampling organization are responsible for ensuring that blanks (excluding trip blanks) are collected at a minimum of 5% of each reported test result/matrix combination.

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# DEP-SOP-001/01 FQ 1000 Field Quality Control Requirements

- 1.1. If a party wishes to claim that a positive result is due to external contamination sources during sample collection, transport or analysis, then at least one field collected blank (excludes trip blanks) must have been collected at the same time the samples were collected and analyzed with the same sample set.
- 2. Collect at least one blank (excluding trip blanks) for each reported test result/matrix combination each year.
- 3. When collecting a set of blanks, use the following criteria:

#### 3.1. Equipment Blanks:

- 3.1.1. Collect field-cleaned equipment blanks if any sample equipment decontamination is performed in the field.
- 3.1.2. If no decontamination is performed in the field collect precleaned equipment blanks if the equipment is not certified clean by the vendor or the laboratory providing the equipment.

#### 3.2. Field Blanks:

- 3.2.1. Collect field blanks if no equipment except the sample container is used to collect the samples or if the sampling equipment is certified clean by the vendor or the laboratory providing the equipment.
- 4. OPTIONAL QUALITY CONTROL MEASURES
  - 4.1. The method or project may require collection of additional quality control measures as outlined in FQ 1210 (Blanks), FQ 1220 (Duplicates) and FQ 1240 (Split Samples).
  - 4.2. Trip blanks are not required, but must be collected and analyzed if the analytical test method requires them. If collected, these blanks are in addition to the requirements specified in sections 1 and 2 above.

#### FQ 1240. SPLIT SAMPLES

The FDEP or the client may require split samples as a means of determining compliance or as an added measure of quality control. Unlike duplicate samples that measure the variability of both the sample collection and laboratory procedures, split samples measure only the variability **between** laboratories. Therefore, the laboratory samples must be subsamples of the same parent sample and every attempt must be made to ensure sample homogeneity.

Collect, preserve, transport and document split samples using the same protocols as the related samples. In addition, attempt to use the same preservatives (if required).

If split samples are incorporated as an added quality control measure, the FDEP recommends that all involved parties agree on the logistics of collecting the samples, the supplier(s) of the preservatives and containers, the analytical method(s), and the statistics that will be used to evaluate the data.

### FQ 1241. Soils, Sediments, Chemical Wastes and Sludges

Collecting split samples for these matrices is not recommended because a true split sample in these matrices is not possible.

#### FQ 1242. Water

Collect split samples for water in one of two ways:

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# FQ 1000 Field Quality Control Requirements

- 1. Mix the sample in a large, appropriately precleaned, intermediate vessel (a churn splitter is recommended). This method shall not be used if volatile or extractable organics, oil and grease or total petroleum hydrocarbons are of interest. While continuing to thoroughly mix the sample, pour aliquots of the sample into the appropriate sample containers. Alternatively:
- 2. Fill the sample containers from consecutive sample volumes from the same sampling device. If the sampling device does not hold enough sample to fill the sample containers, use the following procedure:
  - 2.1. Fill the first container with half of the sample, and pour the remaining sample into the second container.
  - 2.2. Obtain an additional sample, pour the first half into the **second** container, and pour the remaining portion into the first container.
  - 2.3. Continue with steps described in sections 2.1 and 2.2 above until both containers are filled.

#### FQ 1250. QUALITY CONTROL DOCUMENTATION

- 1. Document all field quality control measures in the permanent field records.
- 2. At a minimum, record the following information:
  - The type, time and date that the quality control sample was collected; and
  - The preservative(s) (premeasured or added amount) and preservation checks performed.
- 3. If blanks are collected/prepared by the field organization, maintain records of the following:
  - Type of analyte-free water used;
  - Source of analyte-free water (include lot number if commercially purchased);
  - A list of the sampling equipment used to prepare the blank.

If items 3.1 through 3.3 are specified in an internal SOP, you may reference the SOP number and revision date in the field notes. Note any deviations to the procedure in the field notes.

- 4. For duplicates, record the technique that was used to collect the sample.
- 5. For split samples, identify the method used to collect the samples and the source(s) of the sample containers and preservatives.

#### FQ 1300. Field Measurements

The following are the quality control requirements for the field measurements discussed in FT 11100 through 2400. There may be additional requirements specified in the method or by FDEP Programs.

#### FQ 1310. FREQUENCY

1. To be acceptable, a field test result must be bracketed between acceptable calibration results.

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# DEP-SOP-001/01 FQ 1000 Field Quality Control Requirements

- 1.1. The first check may be an initial calibration, but the second must be a continuing verification check.
- 2. Verify or calibrate each field instrument prior to use (see FT 1000).
- 3. Verify the calibration at no more than 24-hour intervals during use and at the end of the use if the instrument will not be used the next day or any time period greater than 24 hours.
- 4. All initial calibration and verification checks must meet the acceptance criteria outlined in FT 1100 FT 2400.
- 5. If a verification check or initial calibration fails to meet acceptance criteria, immediately recalibrate the instrument or remove it from service.
- 6. If a calibration check fails to meet acceptance criteria (see FT 1100 FT 2400) and it is not possible to reanalyze the sample(s):
  - 6.1. Report all results between the last acceptable calibration check and the failed calibration check: as estimated (report the value with a "J");
  - 6.2. Include a narrative description of the problem; and
  - 6.3. Shorten the time period between verification checks or replace/repair the instrument.
- 7. If historically generated data demonstrate that a specific instrument remains stable for longer periods of time, the time interval between initial calibration and/or calibration checks may be increased.
  - 7.1. All acceptable field data must be bracketed by acceptable checks (see FQ 1310, section 1 above). Qualify data that are not bracketed by acceptable checks (see FQ 1310, section 6.1 above).
  - 7.2. The maximum time interval is 1 month or at the conclusion of a sampling event, whichever is less.
  - 7.3. Base the selected time interval on the shortest interval that the instrument maintains stability.
  - 7.4. If an extended time interval is used, and the instrument consistently fails to meet the final calibration check:
    - 7.4.1. The instrument may need maintenance to correct the problem; or
    - 7.4.2. The time period is too long and must be decreased.
- 8. For instruments that are deployed for extended periods of time, calibrate the instrument before deployment and verify the calibration at the end of the deployment.
  - 8.1. All acceptable field data must be bracketed by acceptable checks (see FQ 1310, section 1 above) or the data must be qualified (see FQ 1310, section 6.1 above).
- 9. For continuous monitoring instruments, all acceptable field data must be bracketed by acceptable checks (see FQ 1310, section 1 above), or the data must be qualified (see FQ 1310, section 6 above).

#### FQ 1320. FIELD MEASUREMENT DOCUMENTATION

1. Record each calibration check (initial, continuing or final) in the permanent field records (or calibration logs). At a minimum, these records must indicate:

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### DEP-SOP-001/01 FQ 1000 Field Quality Control Requirements

- 1.1. Date, time and location (e.g., monitoring well XXX; laboratory; etc.) of each calibration check;
- 1.2. Individual performing the check;
- 1.3. Results of each check, including the concentration/type of standard, expected reading, and the actual reading;
- 1.4. Whether the check met or failed acceptance criteria;
- 1.5. Readings associated with a failed check; and
- 1.6. Corrective actions associated with failed check (such as recalibration, removal from use, etc.).

### FQ 1400. References

- 1. Florida Department of Environmental Protection, <u>DEP Standard Operating Procedures for Laboratory Operations and Sample Collection Activities, DEP QA-001/92, September 1992.</u>
- 2. U.S. Environmental Protection Agency, Region 4, <u>Environmental Investigations Standard Operating Procedures and Quality Assurance Manual</u>, May 1996.

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<b>FOLDER NUMBER</b>	BRIEF DESCRIPTION	Τ
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# APPENDIX I-5 FS 2200 - GROUNDWATER SAMPLING

# FS 2200. Groundwater Sampling

- 1. INTRODUCTION AND SCOPE
  - 1.1. Use these Standard Operating Procedures to collect groundwater samples. They are designed to ensure that the collected samples will be representative of water in the aquifer or target formation and that the samples have not been altered or contaminated by the sampling and handling procedures. Use of alternative, FDEP-approved and properly documented procedures (e.g., Corporate SOP, ASTM Standards, alternative equipment, etc.) is acceptable if they meet the intent (e.g., sample representativeness and integrity) of this standard (see FA 1000).
  - 1.2. The topics in this SOP include equipment and supply selection, equipment construction materials, and purging and sampling techniques.
  - 1.3. Use the following FDEP SOPs in conjunction with FS 2200:
    - FA 1000 Regulatory Scope and Administrative Procedures for Use of DEP SOPs
    - FC 1000 Cleaning/Decontamination Procedures
    - FD 1000 Documentation Procedures
    - FQ 1000 Field Quality Control Requirements
    - FS 1000 General Sampling Procedures
    - FS 2000 General Aqueous Sampling
    - FT 1000 Field Testing and Measurement
  - 1.4. Groundwater samples may be collected from a number of different configurations. Each configuration is associated with a unique set of sampling equipment requirements and techniques:
    - 1.4.1. Wells without Plumbing: These wells require that equipment be brought to the well to purge and sample unless dedicated equipment is placed in the well.
    - 1.4.2. Wells with In-Place Plumbing: Wells with in-place plumbing do not require that equipment be brought to the well to purge and sample. In-place plumbing is generally considered permanent equipment routinely used for purposes other than purging and sampling, such as for water supply. They are generally found at wellfields, industrial facilities, and private residences. See FS 2300 for procedures to sample potable water wells.
    - 1.4.3. <u>Air Strippers or Remedial Systems</u>: These types of systems are installed as remediation devices. Sample these wells like drinking water wells (see FS 2300).

# FS 2201. Equipment and Supplies

Use groundwater purging and sampling equipment constructed of only non-reactive, non-leachable materials that are compatible with the environment and the selected analytes. In selecting groundwater purging and sampling equipment, give consideration to the depth of the well, the depth to groundwater, the volume of water to be evacuated, the sampling and purging technique, and the analytes of interest. Refer to Tables FS 1000-1, FS 1000-2, FS 1000-3 and FS 2200-1 for selection of appropriate equipment.

Additional supplies such as reagents and preservatives may be necessary.

1. PUMPS: All pumps or pump tubing must be lowered and retrieved from the well slowly and carefully to minimize disturbance to the formation water. This is especially critical at the air/water interface.

### 1.1. Above-Ground Pumps

- 1.1.1. <u>Variable Speed Peristaltic Pump</u>: Use a variable speed peristaltic pump to purge groundwater from wells when the static water level in the well is no greater than 20-25 feet below land surface (BLS). If the water levels are deeper than 18-20 feet BLS, the pumping velocity will decrease.
  - 1.1.1.1. A variable speed peristaltic pump can be used for normal purging and sampling (FS 2213 and FS 2221), sampling low permeability aquifers or formations (FS 2222) and collecting filtered groundwater samples (FS 2225, section 1).
  - 1.1.1.2. Most analyte groups can be sampled with a peristaltic pump if the tubing and pump configurations are appropriate. See Table FS 1000-3 for proper tubing selection and pump configurations.
- 1.1.2. <u>Variable Speed Centrifugal Pump</u>: A variable speed centrifugal pump can be used to purge groundwater from 2-inch and larger internal diameter wells. **Do not use** this type of pump to collect groundwater samples.
  - 1.1.2.1. When purging is complete, do not allow the water that remains in the tubing to fall back into the well. Install a check valve at the end of the purge tubing, and withdraw the tubing slowly from the well while the pump is still running.
  - 1.1.2.2. See Table FS 1000-3 for proper tubing selection and allowable analyte groups.

# 1.2. Submersible Pumps

- 1.2.1. <u>Variable Speed Electric Submersible Pump</u>: A variable speed submersible pump can be used to purge and sample groundwater from 2-inch and larger internal diameter wells.
  - 1.2.1.1. A variable speed submersible pump can be used for normal purging and sampling (FS 2213 and FS 2221), sampling low permeability aquifers or formations (FS 2222) and collecting filtered groundwater samples (FS 2225, section 1).
  - 1.2.1.2. Make sure that the pump housing, fittings, check valves and associated hardware are constructed of stainless steel. Make sure that any other materials are compatible with the analytes of interest. See Table FS 1000-3 for restrictions.
  - 1.2.1.3. Install a check valve at the output side of the pump to prevent backflow.
  - 1.2.1.4. If purging and sampling for organics:
    - The entire length of the delivery tube must be Teflon, Polyethylene or Polypropylene (PP) tubing.
    - The electrical cord must be sealed in Teflon, Polyethylene or PP and any cabling must be sealed in Teflon, Polyethylene or PP, or be constructed of stainless steel.
    - All interior components that contact the sample water (impeller, seals, gaskets, etc.) must be constructed of stainless steel or Teflon.

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- 1.2.2. <u>Variable Speed Bladder Pump</u>: A variable speed positive displacement bladder pump (no-gas contact) can be used to purge and sample groundwater from 3/4-inch and larger internal diameter wells.
  - 1.2.2.1. A variable speed bladder pump can be used for normal purging and sampling (FS 2213 and FS 2221), sampling low permeability aquifers or formations (FS 2222) and collecting filtered groundwater samples (FS 2225, section 1).
  - 1.2.2.2. The bladder pump system is composed of the pump, the compressed air tubing, the water discharge tubing, the controller and a compressor or compressed gas supply.
  - 1.2.2.3. The pump consists of a bladder and an exterior casing or pump body that surrounds the bladder and two (2) check valves. These parts can be composed of various materials, usually combinations of polyvinyl chloride (PVC), Teflon, Polyethylene, PP and stainless steel. Other materials must be compatible with the analytes of interest. See Table FS 1000-3 for restrictions.
  - 1.2.2.4. If purging and sampling for organics:
    - The pump body must be constructed of stainless steel and the valves and bladder must be Teflon, Polyethylene or PP.
    - The entire length of the delivery tube must be Teflon, Polyethylene or PP.
    - Any cabling must be sealed in Teflori, Polyethylene or PP, or be constructed of stainless steel.
  - 1.2.2.5. Permanently installed pumps may have a PVC pump body as long as the pump remains in contact with the water in the well.

#### 2. BAILERS:

- 2.1. <u>Purging</u>: FDEP does not recommend using bailers for purging unless no other equipment can be used or purging with a bailer has been specifically authorized by an FDEP program, permit, contract or order (see Table FS 2200-3). Use a bailer if there is non-aqueous phase liquid (free product) in the well or non-aqueous phase liquid is suspected to be in the well. If in doubt about the appropriateness of using a bailer at a site or during a particular sampling event, contact the appropriate FDEP program or project manager. If a bailer is used, follow FS 2213, section 4 with no deviations.
- 2.2. <u>Sampling</u>: Bailers may be used to routinely collect some analyte groups or under specific circumstances for other analyte groups (see Table FS 2200-3).

#### 2.3. Construction and Type:

- 2.3.1. Bailers must be constructed of materials compatible with the analytes of interest. See Table FS 1000-3 for restrictions.
  - 2.3.1.1. Stainless steel, Teflon, Polyethylene and PP bailers may be used to sample all analytes.
- 2.3.2. Use disposable bailers when sampling grossly contaminated sample sources.
- 2.3.3. FDEP recommends using dual check valve bailers when collecting samples.
- 2.3.4. Use bailers with a controlled flow bottom when collecting volatile organic samples.

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- 2.3.5. Use bailers that can be pressurized when collecting filtered samples for metals.
- 2.4. Contamination Prevention:
  - 2.4.1. Keep the bailer wrapped (foil, butcher paper, etc.) until just before use.
  - 2.4.2. Use protective gloves to handle the bailer once it is removed from its wrapping.
  - 2.4.3. Handle the bailer by the lanyard to minimize contact with the bailer surface.

#### 3. LANYARDS

- 3.1. Lanyards must be made of non-reactive, non-leachable material. They may be cotton twine, nylon, stainless steel, or may be coated with Teflon, Polyethylene or PP.
- 3.2. Discard cotton twine, nylon, and non-stainless steel braided lanyards after sampling each monitoring well.
- 3.3. Decontaminate stainless steel, coated Teflon, Polyethylene and PP lanyards between monitoring wells (see FC 1003). They do not need to be decontaminated between purging and sampling operations.

#### FS 2210. GROUNDWATER PURGING

# FS 2211. Water Level and Purge Volume Determination

Collect groundwater samples from fresh water from the aquifer. The amount of water that must be purged from a well is determined by the volume of water and/or field parameter stabilization.

- 1. GENERAL EQUIPMENT CONSIDERATIONS
  - 1.1. Selection of appropriate purging equipment depends on the analytes of interest, the well diameter, transmissivity of the aquifer, the depth to groundwater and other site conditions.
  - 1.2. Use a pump to purge the well unless no other equipment can be used or there is non-aqueous phase liquid in the well or non-aqueous phase liquid is suspected to be in the well.
    - 1.2.1. FDEP does not recommend using bailers because improper bailing:
      - Introduces atmospheric oxygen which may precipitate metals (i.e., iron) or cause other changes in the chemistry of the water in the sample (i.e., pH)
      - Agitates groundwater which may bias volatile and semi-volatile organic analyses due to volatilization
      - Agitates the water in the aquifer and resuspends fine particulate matter
      - Surges the well loosening particulate matter in the annular space around the well screen
      - May introduce dirt into the water column if the sides of the casing wall are scraped
    - 1.2.2. Bailers may be used if approved by an FDEP program, or if bailer use is specified in a permit, contract or FDEP order (see Table FS 2200-3). If used, bailers must be of appropriate type and construction, and the user must follow the procedure outlined in 2213, section 4 with no deviations. If in doubt about the appropriateness of

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using a bailer at a site or during a particular sampling event, contact the appropriate FDEP program or project manager.

#### 2. INITIAL INSPECTION

- 2.1. Remove the well cover and remove all standing water around the top of the well casing (manhole) before opening the well.
- 2.2. Inspect the exterior protective casing of the monitoring well for damage and document the results of the inspection if there is a problem.
- 2.3. It is recommended that you place a protective covering around the well head. Replace the covering if it becomes soiled or ripped.
- 2.4. Inspect the well lock and determine whether the cap fits tightly. Replace the cap if necessary.
- 3. WATER LEVEL MEASUREMENTS: Use an electronic probe or chalked tape to determine the water level.
  - 3.1. Decontaminate all equipment before use.
  - 3.2. Measure the depth to groundwater from the top of well casing to the nearest 0.01 foot and always measure from the same reference point or survey mark on the well casing.
  - 3.3. Record the measurement.

#### 3.4. Electronic Probe

- 3.4.1. Decontaminate all equipment before use.
  - 3.4.1.1. Follow the manufacturer's instructions for use.
  - 3.4.1.2. Record the measurement.

#### 3.5. Chalked Line Method

- 3.5.1. Decontaminate all equipment before use.
- 3.5.2. Lower chalked tape into the well until the lower end is in the water (usually determined by the sound of the weight hitting the water).
- 3.5.3. Record the length of the tape relative to the reference point (see section 3.2 above).
- 3.5.4. Remove the tape and note the length of the wetted portion.
- 3.5.5. Record the length.
- 3.5.6. Determine the depth to water by subtracting the length of the wetted portion (section 3.5.4 above) from the total length (section 3.5.3 above). Record the result.

### 4. WATER COLUMN DETERMINATION

- 4.1. Subtract the depth to the top of the water column from the total well depth to determine the length of the water column.
- 4.2. The total well depth depends on the well construction. Some wells may be drilled in areas of sinkhole or karst formations or rock leaving an open borehole. Attempt to find the total borehole depth in cases where there is an open borehole below the cased portion.

#### 5. WELL WATER VOLUME

5.1. Calculate the total volume of water in gallons in the well using the following equation:

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### $V = (0.041)d \times d \times h$

Where:

V = volume in gallons

d = well diameter in inches

h = height of the water column in feet

5.2. The total volume of water in the well may also be determined with the following equation by using a casing volume per foot factor (Gallons per Foot of Water) for the appropriate diameter well:

# V = [Gallons per Foot of Water] x h

Where:

V = volume in gallons

h = height of the water column in feet

	T		
Casing Internal Diameter	Approximate Gallons per Foot of Water		
0.75"	0.02		
1"	0.04		
1.25"	0.06		
2"	0.16		
3"	0.37		
4"	0.65		
5"	1.02		
6"	1.47		
12"	5.88		

- 5.3. Record all measurements and calculations in the field records.
- 6. PURGING EQUIPMENT VOLUME
  - 6.1. Calculate the total volume of the pump, associated tubing and flow cell, if used, using the following equation:

$$V = p + ((0.041)d \times d \times I) + fc$$

Where

V = volume in gallons

p = volume of pump in gallons

d = tubing diameter in inches

I = length of tubing in feet

fc = volume of flow cell in gallons

7. When collecting samples from multiple wells on a site, if the groundwater elevation data are to be used to construct groundwater elevation contour maps, all water level measurements must be taken within the same 24 hour time interval unless a shorter time period is required by a FDEP program. If the site is tidally influenced, complete the water level measurements within the time frame of an incoming or outgoing tide.

# FS 2212. Well Purging Techniques

The selection of the purging technique and equipment is dependent on the hydrogeologic properties of the aquifer, especially depth to groundwater and hydraulic conductivity. Equipment selection must comply with construction and configuration requirements specified in Table FS 2200-1 and the discussions in FS 2201.

- 1. MEASURING THE PURGE VOLUME: The volume of water that is removed during purging must be recorded. Therefore, you must measure the volume during the purging operation.
  - 1.1. Collect the water in a graduated container and multiply the number of times the container was emptied by the volume of the container, or
  - 1.2. Estimate the volume based on pumping rate. This technique may be used only if the pumping rate is constant. Determine the pumping rate by measuring the amount of water that is pumped for a fixed period of time or use a flow meter.
    - 1.2.1. Calculate the amount of water that is discharged per minute:

$$D = \frac{\text{Measured amount}}{\text{Total time in minutes}}$$

1.2.2. Calculate the time needed to purge one (1) well volume or one (1) purging equipment volume:

Time = 
$$\frac{V}{D}$$

Where:

V = well volume determined from FS 2211, section 5 or purging equipment volume

D = discharge rate calculated in section 1.2.1. above

- 1.2.3. Make new measurements (section 1.2.1 above) each time the pumping rate is changed.
- 1.3. Use a totalizing flow meter.
  - 1.3.1. Record the reading on the totalizer prior to purging.
  - 1.3.2. Record the reading on the totalizer at the end of purging.
  - 1.3.3. Subtract the reading on the totalizer prior to purging from the reading on the totalizer at the end of purging to obtain the volume purged.
- 1.4. Record in the field records the times that purging begins and ends.
- 2. PURGING MEASUREMENT FREQUENCY
  - 2.1. When purging a well that has the well screen fully submerged and the pump or intake tubing is placed within the well casing above the well screen or open hole, purge a minimum of one (1) well volume prior to collecting measurements of the field parameters. Allow at least one quarter (1/4) well volume to purge between subsequent measurements.
  - 2.2. When purging a well that has the pump or intake tubing placed within a fully submerged well screen or open hole, purge until the water level has stabilized (well recovery rate equals the purge rate), then purge a minimum of one (1) volume of the pump, associated tubing and flow cell (if used) prior to collecting measurements of the field parameters. Take measurements of the field parameters no sooner than two (2) to three (3)

minutes apart. Purge at least three (3) volumes of the pump, associated tubing and flow cell, if used, prior to collecting a sample.

- When purging a well that has a partially submerged well screen, purge a minimum of one (1) well volume prior to collecting measurements of the field parameters. Take measurements of the field parameters no sooner than two (2) to three (3) minutes apart.
- 3. PURGING COMPLETION: Purging is considered complete if any one of the following three (3) criteria are satisfied:
  - Three (3) consecutive measurements in which the three (3) parameters listed below 3.1. are within the stated limits, Dissolved Oxygen is no greater than 20 percent of saturation at the field measured temperature, and Turbidity is no greater than 20 Nephelometric Turbidity Units (NTUs).

Temperature:

+ 0.2° C

:Ha

± 0.2 Standard Units

Specific Conductance: ± 5.0% of reading

Document and report the following, as applicable, except that the last four (4) items only need to be submitted once:

- · Purging rate.
- Drawdown in the well, if any.
- A description of the process and the data used to design the well.
- The equipment and procedure used to install the well.
- The well development procedure.
- Pertinent lithologic or hydrogeologic information.
- If it is impossible to get Dissolved Oxygen at or below 20 percent of saturation at the field measured temperature, or Turbidity at or below 20 NTUs, then three (3) consecutive measurements of Temperature, pH, Specific Conductance and the parameter(s) Dissolved Oxygen and/or Turbidity that does not meet the requirements in section 3.1 above must be within the limits listed below:

Temperature:

+ 0.2° C

+ 0.2 Standard Units

Specific Conductance:

± 5.0% of reading

Dissolved Oxygen:

± 0.2 mg/L or 10%, whichever is greater

Turbidity:

± 5 NTUs or 10%, whichever is greater

Additionally, document and report the following, as applicable, except that the last four (4) items only need to be submitted once:

- Purging rate.
- Drawdown in the well, if any.

- A description of conditions at the site that may cause the Dissolved Oxygen to be high and/or Dissolved Oxygen measurements made within the screened or open hole portion of the well with a downhole dissolved oxygen probe.
- A description of conditions at the site that may cause the Turbidity to be high and any procedures that will be used to minimize Turbidity in the future.
- A description of the process and the data used to design the well.
- The equipment and procedure used to install the well.
- The well development procedure.
- Pertinent lithologic or hydrogeologic information.

If from review of the submitted data the Department determines that both the elevated Dissolved Oxygen and Turbidity measurements are due to naturally occurring conditions, then only the first two (2) items are required to be submitted in future reports. However, if the Department cannot determine if the Dissolved Oxygen or Turbidity is elevated due to naturally occurring conditions, then in addition to the first two (2) items, a description of the conditions at the site that may have caused the affected parameter(s) to be high is required to be submitted in future reports.

3.3. If after five (5) well volumes, three (3) consecutive measurements of the field parameters Temperature, pH, Specific Conductance, Dissolved Oxygen, and Turbidity are not within the limits stated in section 3.2 above, check the instrument condition and calibration, purging flow rate and all tubing connections to determine if they might be affecting the ability to achieve stable measurements. It is at the discretion of the project leader whether or not to collect a sample or to continue purging.

Further, the report in which the data are submitted must include the following, as applicable, except that the last four (4) items only need to be submitted once:

- Purging rate.
- Drawdown in the well, if any.
- A description of conditions at the site that may cause the Dissolved Oxygen to be high and/or Dissolved Oxygen measurements made within the screened or open hole portion of the well with a downhole dissolved oxygen probe.
- A description of conditions at the site that may cause the turbidity to be high and any procedures that will be used to minimize turbidity in the future.
- A description of the process and the data used to design the well.
- The equipment and procedure used to install the well.
- The well development procedure.
- Pertinent lithologic or hydrogeologic information.

If from review of the submitted data the FDEP determines that both the elevated Dissolved Oxygen and Turbidity measurements are due to naturally occurring conditions, then only the first two (2) items are required to be submitted in future reports. However, if the FDEP cannot determine if the Dissolved Oxygen or Turbidity is elevated due to naturally occurring conditions, then in addition to the first two (2) items, a description of the conditions at the site that may have caused the affected parameter(s) to be high is required to be submitted in future reports.

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- 3.4. One fully dry purge (not recommended). This criterion applies only if purging was attempted per FS 2212, FS 2213, and section 3.4.1 below, and if it is impossible to balance the pumping rate with the rate of recharge at very low pumping rates (< 100 mL/minute).
  - 3.4.1. If wells have previously and consistently purged dry, when purged according to FS 2212 and FS 2213, and the current depth to groundwater indicates that the well will purge dry during the current sampling event, minimize the amount of water removed from the well by using the same pump to purge and collect the sample:
    - 3.4.1.1. Place the pump or tubing intake within the well screened interval.
    - 3.4.1.2. Use very small diameter Teflon, Polyethylene or PP tubing and the smallest possible pump chamber volume to minimize the total volume of water pumped from the well and to reduce drawdown.
    - 3.4.1.3. Select tubing that is thick enough to minimize oxygen transfer through the tubing walls while pumping.
    - 3.4.1.4. Pump at the lowest possible rate (100 mL/minute or less) to reduce drawdown to a minimum.
    - 3.4.1.5. Purge at least two (2) volumes of the pumping system (pump, tubing and flow cell, if used).
    - 3.4.1.6. Measure pH, Specific Conductance, Temperature, Dissolved Oxygen and Turbidity and begin to collect the samples (see FS 2222)..
- 4. Collect samples immediately after purging is complete. The time period between completing the purge and sampling cannot exceed six (6) hours. If sample collection does not occur within one (1) hour of purging completion, re-measure the five (5) field parameters Temperature, pH, Specific Conductance, Dissolved Oxygen and Turbidity just prior to collecting the sample. If the measured values are not within 10 percent of the previous measurements, re-purge the well. The exception is "dry" wells (see section 3.4 above).

#### 5. LANYARDS

- 5.1. Securely fasten lanyards, if used, to any downhole equipment (bailers, pumps, etc.).
- 5.2. See FS 2201, section 3 for acceptable lanyard types and use.
- 5.3. Use bailer lanyards in such a way that they do not touch the ground surface.

# FS 2213. Wells Without Plumbing

#### 1. TUBING/PUMP PLACEMENT

- 1.1. If you are attempting to minimize the volume of purge water, the pump will be used for both purging and sampling, the well screen interval is less than or equal to 10 feet, and the well screen is fully submerged, position the intake hose or pump at the midpoint of the screened or open hole interval.
- 1.2. If monitoring well conditions do not allow minimizing of the purge water volume (see 1.1 above) or you intend to collect samples with equipment different than that used to purge, position the pump or intake hose near the top of the water column. This will ensure that all stagnant water in the casing is removed.
- 1.3. If the well screen or borehole is partially submerged, and the pump will be used for both purging and sampling, position the pump midway between the measured water level and the bottom of the screen. Otherwise position the pump as described in 1.2 above.

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# 2. NON-DEDICATED (PORTABLE) PUMPS

# 2.1. Variable Speed Peristaltic Pump

- 2.1.1. Wear sampling gloves to position the decontaminated pump and tubing.
- 2.1.2. Attach a short section of tubing to the discharge side of the pump and into a graduated container.
- 2.1.3. Attach one end of a length of new or precleaned tubing to the pump head flexible hose.
- 2.1.4. Place the tubing per one of the options in FS 2213, section 1 above.
- 2.1.5. Change gloves before beginning purging.
- 2.1.6. Measure the depth to groundwater at frequent intervals.
- 2.1.7. Record these measurements.
- 2.1.8. Adjust the purging rate so that it is equivalent to the well recovery rate to minimize drawdown.
- 2.1.9. If the purging rate exceeds the well recovery rate, reduce the pumping rate to balance the withdrawal rate with the recharge rate.
- 2.1.10. If the water table continues to drop during pumping, lower the tubing at the approximate rate of drawdown so that the water is removed from the top of the water column.
- 2.1.11. Record the purging rate each time the rate changes.
- 2.1.12. Measure the purge volume by one of the methods outlined in FS 2212, section 1.
- 2.1.13. Record this measurement.
- 2.1.14. Decontaminate the pump and tubing between wells (see FC 1000) or only the pump if precleaned tubing is used for each well.

# 2.2. Variable Speed Centrifugal Pump

- 2.2.1. Position fuel powered equipment **downwind** and at least 10 feet from the well head. Make sure that the exhaust faces downwind.
- 2.2.2. Wear sampling gloves to position the decontaminated pump and tubing.
- 2.2.3. Place the decontaminated suction hose so that water is always pumped from the top of the water column.
- 2.2.4. Change gloves before beginning purging.
- 2.2.5. Equip the suction hose with a foot valve to prevent purge water from re-entering the well.
- 2.2.6. Measure the depth to groundwater at frequent intervals.
- 2.2.7. Record these measurements.
- 2.2.8. Adjust the purging rate so that it is equivalent to the well recovery rate to minimize drawdown.
- 2.2.9. If the purging rate exceeds the well recovery rate, reduce the pumping rate to balance the withdrawal rate with the recharge rate.

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- 2.2.10. If the water table continues to drop during pumping, lower the tubing at the approximate rate of drawdown so that the water is removed from the top of the water column.
- 2.2.11. Record the purging rate each time the rate changes.
- 2.2.12. Measure the purge volume by one of the methods outlined in FS 2212, section 1.
- 2.2.13. Record this measurement.
- 2.2.14. Decontaminate the pump and tubing between wells (see FC 1000) or only the pump if precleaned tubing is used for each well.

# 2.3. Variable Speed Electric Submersible Pump

- 2.3.1. Position fuel powered equipment **downwind** and at least 10 feet from the well head. Make sure that the exhaust faces downwind.
- 2.3.2. Wear sampling gloves to position the decontaminated pump and tubing.
- 2.3.3. Carefully position the decontaminated pump per one of the options in FS 2213, section 1 above.
- 2.3.4. Change gloves before beginning purging.
- 2.3.5. Measure the depth to groundwater at frequent intervals.
- 2.3.6. Record these measurements.
- 2.3.7. Adjust the purging rate so that it is equivalent to the well recovery rate to minimize drawdown.
- 2.3.8. If the purging rate exceeds the well recovery rate, reduce the pumping rate to balance the withdrawal rate with the recharge rate.
- 2.3.9. If the water table continues to drop during pumping, lower the tubing or pump at the approximate rate of drawdown so that the water is removed from the top of the water column.
- 2.3.10. Record the purging rate each time the rate changes.
- 2.3.11. Measure the purge volume by one of the methods outlined in FS 2212, section 1.
- 2.3.12. Record this measurement.
- 2.3.13. Decontaminate the pump and tubing between wells (see FC 1000) or only the pump if precleaned tubing is used for each well.

# 2.4. Variable Speed Bladder Pump

- 2.4.1. Position fuel powered equipment **downwind** and at least 10 feet from the well head. Make sure that the exhaust faces downwind.
- 2.4.2. Wear sampling gloves to position the decontaminated pump and tubing.
- 2.4.3. Attach the tubing and carefully position the pump per one of the options in FS 2213, section 1 above.
- 2.4.4. Change gloves before beginning purging.
- 2.4.5. Measure the depth to groundwater at frequent intervals.
- 2.4.6. Record these measurements.

- 2.4.7. Adjust the purging rate so that it is equivalent to the well recovery rate to minimize drawdown.
- 2.4.8. If the purging rate exceeds the well recovery rate, reduce the pumping rate to balance the withdrawal rate with the recharge rate.
- 2.4.9. If the water table continues to drop during pumping, lower the tubing or pump at the approximate rate of drawdown so that the water is removed from the top of the water column.
- 2.4.10. Record the purging rate each time the rate changes.
- 2.4.11. Measure the purge volume by one of the methods outlined in FS 2212, section 1.
- 2.4.12. Record this measurement.
- 2.4.13. Decontaminate the pump and tubing between wells (see FC 1000) or only the pump if precleaned tubing is used for each well.
- 3. DEDICATED PORTABLE PUMPS: Place dedicated pumps per one of the options in FS 2213, section 1 above.

# 3.1. <u>Variable Speed Electric Submersible Pump</u>

- 3.1.1. Position fuel powered equipment **downwind** and at least 10 feet from the well head. Make sure that the exhaust faces downwind.
- 3.1.2. Wear sampling gloves.
- 3.1.3. Measure the depth to groundwater at frequent intervals.
- 3.1.4. Record these measurements.
- 3.1.5. Adjust the purging rate so that it is equivalent to the well recovery rate to minimize drawdown.
- 3.1.6. If the purging rate exceeds the well recovery rate, reduce the pumping rate to balance the withdraw with the recharge rate.
- 3.1.7. Record the purging rate each time the rate changes.
- 3.1.8. Measure the purge volume by one of the methods outlined in FS 2212, section 1.
- 3.1.9. Record this measurement.

### 3.2. Variable Speed Bladder Pump

- 3.2.1. Position fuel powered equipment **downwind** and at least 10 feet from the well head. Make sure that the exhaust faces downwind.
- 3.2.2. Wear sampling gloves.
- 3.2.3. Measure the depth to groundwater at frequent intervals.
- 3.2.4. Record these measurements.
- 3.2.5. Adjust the purging rate so that it is equivalent to the well recovery rate to minimize drawdown.
- 3.2.6. If the purging rate exceeds the well recovery rate, reduce the pumping rate to balance the withdraw with the recharge rate.
- 3.2.7. Record the purging rate each time the rate changes.

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- 3.2.8. Measure the purge volume by one of the methods outlined in FS 2212, section 1.
- 3.2.9. Record this measurement.
- 4. BAILERS: FDEP recommends against using bailers for purging except as a last contingency, or if free product is present in the well or suspected to be in the well. However, they may be used if approved by an FDEP program, or specified in a permit, contract or FDEP order (see Table FS 2200-3 and FS 2211, section 1.3.2). If in doubt about the appropriateness of using a bailer at a site or during a particular sampling event, contact the appropriate FDEP program or project manager.
  - 4.1. Minimize handling the bailer as much as possible.
    - 4.1.1. Wear sampling gloves.
    - 4.1.2. Remove the bailer from its protective wrapping just before use.
    - 4.1.3. Attach a lanyard of appropriate material (see FS 2201, section 3).
    - 4.1.4. Use the lanyard to move and position the bailer.
  - 4.2. Lower and retrieve the bailer slowly and smoothly.
    - 4.2.1. Lower the bailer carefully into the well to a depth approximately a foot above the water column.
      - 4.2.1.1. When the bailer is in position, lower the bailer into the water column at a rate of 2 cm/sec until the desired depth is reached (see 4.2.2 below).
    - 4.2.2. Do not lower the top of the bailer more than one (1) foot below the top of the water table so that water is removed from the top of the water column.
    - 4.2.3. Allow time for the bailer to fill with aquifer water as it descends into the water column.
      - 4.2.3.1. Carefully raise the bailer. Retrieve the bailer at the same rate of 2 cm/sec until the bottom of the bailer has cleared to top of the water column.
  - 4.3. Measure the purge volume by one of the methods outlined in FS 2212, section 1.
    - 4.3.1. Record the volume of the bailer.
  - 4.4. Continue to carefully lower and retrieve the bailer as described above until the purging completion conditions specified in FS 2212, section 3 have been satisfied.
    - 4.4.1. Remove at least one (1) well volume before collecting measurements of the field parameters. Take each subsequent set of measurements after removing at least one quarter (1/4) well volume between measurements.

# FS 2214. Wells With Plumbing (permanently installed pumps or production wells)

Wells with in-place plumbing are commonly found at municipal water treatment plants, industrial water supplies, private residences, etc.

- 1. Remove all hoses, aerators and filters (if possible).
- 2. Open the spigot and purge sufficient volume to flush the spigot and lines and until the purging completion criteria in FS 2212, section 3 have been met.

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3. Reduce the flow rate to approximately 500 mL/minute (a 1/8" stream) or approximately 0.1 gal/minute before collecting samples.

# FS 2215. Airstrippers and Remedial Treatment Systems

- 1. Collect influent and effluent samples from air stripping units as described in FS 2214 above.
- 2. Remove any tubing from the sampling port and flush for one to two minutes.

# FS 2220. GROUNDWATER SAMPLING TECHNIQUES

- 1. Purge wells using the techniques outlined in FS 2210.
- 2. Replace the protective covering around the well if it is soiled or torn after completing the purging operations.
- 3. EQUIPMENT CONSIDERATIONS
  - 3.1. Some pumps may be used for sampling groundwater. Follow all notes and restrictions as defined in Table FS 2200-1 and discussed in Equipment and Supplies (FS 2201) when using pumps to collect samples.

NOTE: The only pumps that are currently approved for use in collecting volatile organic samples through the pump are stainless steel and Teflon variable speed submersible pumps, stainless steel and Teflon or Polyethylene variable speed bladder pumps, and permanently installed PVC bodied pumps as long as the pump remains in contact with the water in the well at all times.

- 3.2. Collect the sample into the sample container from the sampling device. **Do not** use intermediate containers.
- 3.3. In order to avoid contaminating the sample or loss of analytes from the sample:
  - 3.3.1. Handle the sampling equipment as little as possible.
  - 3.3.2. Minimize the equipment that is exposed to the sample.

# 3.4. <u>Dedicated Sampling Equipment</u>

- 3.4.1. Whenever possible, use dedicated equipment because it significantly reduces the chance of cross-contamination.
- 3.4.2. Dedicated is defined as equipment that is to be used solely for one location for the life of that equipment (e.g., permanently mounted pump).
- 3.4.3. All material construction and restrictions from Table FS 2200-1 also apply to dedicated equipment. Purchase equipment with the most sensitive analyte of interest in mind.

### 3.4.4. Cleaning/Decontamination

- 3.4.4.1. Clean or make sure dedicated pumps are clean before installation. They do not need to be cleaned prior to each use but must be cleaned if they are withdrawn for repair or servicing.
- 3.4.4.2. Clean or make sure any permanently mounted tubing is clean before installation.
- 3.4.4.3. Change or clean tubing when the pump is withdrawn for servicing.

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- 3.4.4.4. Clean any replaceable or temporary parts as specified in FC 1000.
- 3.4.4.5. Collect equipment blanks on dedicated pumping systems when the tubing is cleaned or replaced.
- 3.4.4.6. Clean or make sure dedicated bailers are clean before placing them into the well.
- 3.4.4.7. Collect an equipment blank on dedicated bailers before introducing them into the water column.
- 3.4.4.8. Suspend dedicated bailers above the water column if they are stored in the well.

# FS 2221. Wells Without Plumbing

1. SAMPLING WITH PUMPS: Variable speed stainless steel and Teflon submersible pumps and stainless steel, Teflon or Polyethylene bladder pumps, and permanently installed PVC bodied pumps, as long as the pump remains in contact with the water in the well at all times, may be used to sample for all organics. The delivery tubing must be Teflon, Polyethylene or PP. Extractable organics may be collected through a peristaltic pump if flexible interior-wall Teflon, Polyethylene or PP tubing is used in the pump head, or through a peristaltic pump with a vacuum trap (see Figure FS 2200-1 for specific configuration) is used. Follow all notes and restrictions as defined in Table FS 2200-1 and discussed in Equipment and Supplies (FS 2201) when using pumps to collect samples.

### 1.1. Peristaltic Pump

### 1.1.1. Volatile Organics:

- 1.1.1.1. Remove the drop tubing from the inlet side of the pump.
- 1.1.1.2. Submerse the drop tubing into the water column.
- 1.1.1.3. Prevent the water in the tubing from flowing back into the well.
- 1.1.1.4. Remove the drop tubing from the well.
- 1.1.1.5. Carefully allow the groundwater to gravity drain into the sample vials. Avoid turbulence. Do not aerate the sample.
- 1.1.1.6. Repeat steps 1.1.1.2 through 1.1.1.5 until enough vials are filled.

### Alternatively

- 1.1.1.7. Use the pump to fill the drop tubing.
- 1.1.1.8. Quickly remove the tubing from the pump.
- 1.1.1.9. Prevent the water in the tubing from flowing back into the well.
- 1.1.1.10. Remove the drop tubing from the well.
- 1.1.1.11. Carefully allow the groundwater to drain into the sample vials. Avoid turbulence. Do not aerate the sample.
- 1.1.1.12. Repeat steps 1.1.1.7 through 1.1.1.11 until enough vials are filled. Or:

- 1.1.1.13. Use the pump to fill the drop tubing
- 1.1.1.14. Withdraw the tubing from the well.
- 1.1.1.15. Reverse the flow on the peristaltic pumps to deliver the sample into the vials at a slow, steady rate.
- 1.1.1.16. Repeat steps 1.1.1.13 through 1.1.1.15 until enough vials are filled.

### 1.1.2. Extractable Organics

- 1.1.2.1. If the tubing in the pump head is Polyethylene or PP, or is Teflon lined, the samples may be collected through the pump.
- 1.1.2.2. If the tubing in the pump head is not Polyethylene or PP, or is not Teflon lined, use the pump and vacuum trap method.
  - Assemble the components of the pump and trap according to Figure FS 2200-1.
  - The sample container should be the trap.
  - All equipment that contacts the groundwater before the sample container must be constructed of Teflon, Polyethylene, PP, stainless steel or glass, including the transport tubing to and from the sample container, the interior liner of the container cap and all fittings. Do not use a rubber stopper as a cap.
  - Connect the outflow tubing from the container to the influent side of the peristaltic pump.
  - Turn the pump on and reduce the flow rate to a smooth and even flow.
  - Discard a small portion of the sample to allow an air space.
  - Preserve (if required), label and complete the field notes.

### 1.1.3. Inorganics

- 1.1.3.1. Inorganic samples may be collected from the effluent tubing. There are a few restrictions on tubing type (see Table FS 2200-1).
- 1.1.3.2. If samples are collected from the pump, decontaminate all tubing (including the tubing in the head) or change it between wells.
- 1.1.3.3. Preserve (if required), label and complete field notes.

### 1.2. Variable Speed Bladder Pump

- 1.2.1. If sampling for organics the pump body must be constructed of stainless steel and the valves and bladder must be Teflon. All tubing must be Teflon, Polyethylene, or PP and any cabling must be sealed in Teflon, Polyethylene or PP, or made of stainless steel.
- 1.2.2. After purging to a smooth even flow, reduce the flow rate.
- 1.2.3. When sampling for volatile organic compounds, reduce the flow rate to 100-200 mL/minute, if possible.

# 1.3. Variable Speed Submersible Pump

1.3.1. The housing must be stainless steel.

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- 1.3.2. If sampling for organics, the internal impellers, seals and gaskets must be constructed of stainless steel, Teflon, Polyethylene or PP. The delivery tubing must be Teflon, Polyethylene or PP and the electrical cord must be sealed in Teflon and any cabling must be sealed in Teflon or constructed of stainless steel.
- 1.3.3. After purging to a smooth even flow, reduce the flow rate.
- 1.3.4. When sampling for volatile organic compounds, reduce the flow rate to 100-200 mL/minute, if possible.
- 2. SAMPLING WITH BAILERS: A high degree of skill and coordination are necessary to collect representative samples with a bailer. When properly used, bailers may be used to collect samples for certain analyte groups and under specific conditions (see Table FS 2200-3). They must be of an appropriate type and construction (see FS 2201, section 2.2), and must be used as outlined below. If in doubt about the appropriateness of using a bailer at a site or during a particular sampling event, contact the appropriate FDEP program or project manager.

### 2.1. General Considerations

- 2.1.1. Minimize handling the bailer as much as possible.
  - 2.1.1.1. Wear sampling gloves.
  - 2.1.1.2. Remove the bailer from its protective wrapping just before use.
  - 2.1.1.3. Attach a lanyard of appropriate material (see FS 2201, section 3).
  - 2.1.1.4. Use the lanyard to move and position the bailers.
- 2.1.2. Do not allow the bailer or lanyard to touch the ground.

#### 2.1.3. Rinsing

- 2.1.3.1. If the bailer is certified precleaned, no rinsing is necessary.
- 2.1.3.2. If both a pump and a bailer are to be used to collect samples, rinse the exterior and interior of the bailer with sample water from the pump before removing the pump.
- 2.1.3.3. If the purge pump is not appropriate for collecting samples (e.g., non-inert components), rinse the bailer with by collecting a single bailer of the groundwater to be sampled. Use the technique described in 2.2, Bailing Technique, below.
- 2.1.3.4. Discard the water appropriately.
- 2.1.3.5. **Do not** rinse the bailer if Oil & Grease, TRPHs, etc. (see FS 2006,) are to be collected.

### 2.2. Bailing Technique

- 2.2.1. Collect all samples that are required to be collected with a pump before collecting samples with the bailer.
- 2.2.2. Raise and lower the bailer gently to minimize stirring up particulate matter in the well and the water column which can increase sample turbidity.
- 2.2.3. Lower the bailer carefully into the well to a depth approximately a foot above the water column.
  - 2.2.3.1. When the bailer is in position, lower the bailer into the water column at a rate of 2 cm/sec until the desired depth is reached (see 2.2.3 below).

- 2.2.4. Do not lower the top of the bailer more than one (1) foot below the top of the water table so that water is removed from the top of the water column.
- 2.2.5. Allow time for the bailer to fill with aquifer water as it descends into the water column.
- 2.2.6. Do not allow the bailer to touch the bottom of the well or particulate matter will be incorporated into the sample.
  - 2.2.6.1. Carefully raise the bailer (2.2.2.2 above). Retrieve the bailer at the same rate of 2 cm/sec until the bottom of the bailer has cleared to top of the water column.
- 2.2.7. Lower the bailer to approximately the same depth each time.
- 2.2.8. Collect the sample.
  - 2.2.8.1. Install a device to control the flow from the bottom of the bailer and discard the first few inches of water.
  - 2.2.8.2. Fill the appropriate sample containers by allowing the sample to slowly flow down the side of the container.
  - 2.2.8.3. Discard the last few inches of water in the bailer.
- 2.2.9. Repeat steps 2.2.1 through 2.2.9 for additional samples.
- 2.2.10. As a final step measure the DO, pH, temperature, turbidity and specific conductance after the final sample has been collected.
  - 2.2.10.1. Record all measurements and note the time that sampling was completed.
- 3. SAMPLING WELLS WITH FLOATING NON-AQUEOUS PHASE LIQUID: FDEP does not recommend the sampling of wells with floating non-aqueous phase liquid for trace contaminants. This concerns primarily petroleum related sites, but includes any chemical product (e.g., solvent) that floats on the water table. Sampling is acceptable if the information is to be used for the purpose of remedial design.

Sample data from such wells cannot provide useful information regarding the level of contamination. Furthermore, FDEP believes that these wells may never provide legitimate data as they may have become (permanently) chemically damaged by the product being in contact with the well casing for an extended period of time.

FDEP does reserve the right to require sampling of these wells, not for levels of trace contaminants, but for confirmation of an appropriate remediation technique. This type of sampling is performed **below** the non-aqueous phase layer (see section 3.2 below).

- 3.1. <u>Non-Aqueous Phase Liquid Sampling</u>: Non-aqueous phase liquid may be evident in a cased monitoring well or in an open excavation.
  - 3.1.1. Non-aqueous phase liquid is normally sampled for two reasons:
    - Documentation for its existence and thickness; and
    - Determination of the type of product so that the proper analyses can be performed to determine extent. This is only feasible for relatively recent releases as it may not be possible to identify weathered product.

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3.1.2. Disposable plastic (acrylic, clear PVC) bailers are recommended for sampling. Disposable Polyethylene and PP bailers are also acceptable. Other wide mouth vessels may be used for sampling non-aqueous phase liquid in an excavation.

#### 3.1.3. Monitoring Well

- 3.1.3.1. If a non-aqueous phase liquid is identified in a monitoring well during the water level measurement, measure its thickness in the well. If the thickness of the non-aqueous phase liquid is greater than 0.01 foot or product globules are present, collect a sample using a precleaned disposable bailer.
- 3.1.3.2. Measure the product thickness to the nearest 0.01 foot after withdrawing the bailer.
- 3.1.3.3. Pour a portion of the product into a glass sample container.
- 3.1.3.4. This sample is considered a concentrated waste. Therefore, package the container in protective wrapping to prevent breakage, isolate from other samples, and ice to 4° C.

### 3.1.4. Excavation

- 3.1.4.1. If non-aqueous phase liquid is observed in an open excavation, a glass sample container or a precleaned intermediate vessel may be used to collect the sample.
- 3.1.4.2. Securely tie a lanyard to the container and lower it into the excavation.
- 3.1.4.3. Gently lower and retrieve the container so that no solid material is released or collected.
- 3.1.4.4. If sufficient water is available, a bailer can be used.
- 3.1.4.5. Although not recommended, screened casing can be placed (or augered and placed) in the bottom of the excavation and the product sampled with a bailer.
- 3.1.4.6. Avoid dangerous situations, such as standing too close to the edge of an excavation, riding in the backhoe bucket, or entering a trench or excavation that may collapse.
- 3.1.4.7. Follow all applicable OSHA regulations.
- 3.1.5. Equipment that is dedicated to sampling non-aqueous phase liquid does not need to be cleaned according to the standard, full decontamination protocols. Acrylic or PVC bailers that are never used for trace contaminant sampling may be cleaned as listed below. It is recommended that all cleaning be done in the lab, office or base of operations and not in the field.
  - 3.1.5.1. Disassemble bailers and intermediate vessels and soak in hot, sudsy tap water using a brush to clean away all particulates and greasy films.
  - 3.1.5.2. Rinse with hot tap water.
  - 3.1.5.3. Thoroughly rinse with analyte free water.
  - 3.1.5.4. An optional acid rinse may be used to strip the equipment of any hard to clean residues.
  - 3.1.5.5. The solvent rinse is not mandatory since this equipment is not used for contaminant sampling, other than the product itself. It is not recommended on clear acrylic.

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## 3.2. Sampling Below Product

- 3.2.1. This type of depth-specific sampling to attempt to sample the dissolved constituents in the water column below the product layer is performed only at the request of FDEP or its designee.
- 3.2.2. These data provide information that helps define adequate groundwater treatment. Without these data, incorrect (and sometimes unnecessarily expensive) remediation techniques may be designed for a situation where they are not required.
- 3.2.3. There are some substantial logistical problems involved with sending a sampler through non-aqueous phase liquid to sample the groundwater below. Although there are some products designed specifically for this type of sampling, they are expensive and the results may not be commensurate with their cost. The use of "self-engineered" equipment or coverings may be the best option.
- 3.2.4. These data are only to be used for qualitative use and will aid in deciding on an appropriate remediation technique.
- 3.2.5. Wrapping bailers and tubing in plastic seems to be the most popular technique in getting past the product layer.
- 3.2.6. Although not recommended, some have wrapped submersible pumps in several layers of plastic and retrieved each layer by a separate lanyard. One suggestion would be to use a rigid piece of stainless steel tubing wrapped in plastic.
  - 3.2.6.1. Once the covered tubing is past the layer, pull up on the plastic, piercing the plastic and exposing the (somewhat) clean tubing inlet.
  - 3.2.6.2. Introduce the wrapped hose slowly to not entrain any more product into the dissolved layer located below.
  - 3.2.6.3. Also, perform this procedure with a peristaltic pump or a vacuum pump linked to a trap bottle. To use this setup, the water table must be no deeper than 15-20 feet, realizing that actual sampling may be occurring several feet below the product layer.

# FS 2222. Sampling Low Permeability Aquifers or Wells that have Purged Dry

- 1. Collect the sample(s) after the well has been purged according to FS 2212, section 3.4.1. Minimize the amount of water removed from the well by using the same pump to purge and collect the sample. If the well has purged dry, collected samples as soon as sufficient sample water is available.
- 2. Measure the five (5) field parameters Temperature, pH, Specific Conductance, Dissolved Oxygen and Turbidity at the time of sample collection.
- 3. Advise the analytical laboratory and the client that the usual amount of sample for analysis may not be available.

# FS 2223. Wells With In-Place Plumbing

If a storage tank is present, locate a cold water spigot, valve or other sampling point close to the well head between the pump and the storage tank. If there is no sampling location between the pump and the storage tank, locate the spigot, valve or other sampling point closest to the tank. Remove all screens or aerators and reduce the flow rate to no more than 500 mL/minute. Collect the samples directly into the appropriate containers.

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# FS 2224. Airstripper and Remedial Treatment System Sampling

Reduce the flow rate to less than 500 mL/minute and begin sample collection. Collect the samples directly into the appropriate containers.

### FS 2225. Filtering Groundwater Samples

- 1. FILTERING GROUNDWATER FOR METALS: Filtered groundwater samples can only be collected after approval from the FDEP program or project manager. If filtering is approved, the FDEP program or permit may require both filtered and unfiltered samples to be collected and reported. Unless specified by the program, use a 1 micrometer (µm) filter.
  - 1.1. Use a disposable, high capacity, 1 µm in-line filter.
    - 1.1.1. Flush the filter with 30-50 mL of analyte free water or an inert gas (nitrogen) to remove atmospheric oxygen;

or

- 1.1.2. Insert the filter on the high pressure side (i.e., on the delivery side) of the pump. Hold the filter upright with the inlet and outlet vertical. Pump water from the aquifer through the filter until all atmospheric oxygen has been removed.
- 1.2. Use a variable speed pump that can be fitted with an in-line filter on the outlet end. Peristaltic pumps, bladder pumps or submersible pumps can be used when water levels are no greater than 20 to 25 feet deep; bladder pumps or submersible pumps must be used when water levels are greater than 20 to 25 feet deep.
  - 1.2.1. Install new or precleaned silastic tubing in the variable speed peristaltic pump head at each monitoring well.
  - 1.2.2. Use new or precleaned delivery tubing at each monitoring well.
- 1.3. Collect filtered samples by either of the methods outlined below if the static water level in the well is too deep for a variable speed peristaltic pump and a variable speed electric submersible pump or variable speed bladder pump of appropriate configuration is not available. Do not agitate the sample or expose it to atmospheric oxygen. **Do not** pour the sample into any intermediate vessel for subsequent filtration.
  - 1.3.1. Collect the sample in a Polyethylene, Teflon or PP bailer that can be pressurized. When the bailer has been retrieved, immediately connect the filter and begin to pressurize the bailer;

or

- 1.3.2. Collect the sample with a bailer and immediately place the intake tube of the peristaltic pump into the full bailer and begin pumping the water through the filter as described in section 1.2 above.
- 1.4. **Do not** use the following equipment for filtering groundwater samples for metals:
  - 1.4.1. Any pump and apparatus combination in which the filter is on the vacuum (suction) side of the pump.
  - 1.4.2. Any type of syringe or barrel filtration apparatus.
  - 1.4.3. Any filter that is not encased in a one-piece, molded unit.

### FS 2230. REFERENCES

- 1. Florida Department of Environmental Protection, <u>DEP Standard Operating Procedures for Laboratory Operations and Sample Collection Activities, DEP QA-001/92</u>, September 1992.
- 2. U.S. Environmental Protection Agency, Region 4, <u>Environmental Investigations Standard Operating Procedures and Quality Assurance Manual</u>, May 1996.

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# Appendix FS 2200 Tables, Figures and Forms

Table FS 2200-1	Equipment for Collecting Groundwater Samples
Table FS 2200-2	Dissolved Oxygen Saturation
Table FS 2200-3	Allowable Uses for Bailers
Figure FS 2200-1	Pump and Trap for Extractable Organics
Form FD 9000-24	Groundwater Sampling Log

# Table FS 2200-1 Equipment for Collecting Groundwater Samples

Activity	Equipment Type		
Well Purging	Variable speed centrifugal pump		
	Variable speed submersible pump		
	Variable speed bladder pump		
	Variable speed peristaltic pump		
	Bailer with lanyard: Not Recommended		
Well-Stabilization	pH meter		
25-50-10-10-20-2-2-2-2-2-2-2-2-2-2-2-2-2-2-2	DO meter		
	Conductivity meter		
ï.	Thermometer/Thermistor		
·	Turbidimeter		
	Flow-through cell		
	Multi-function meters		
Sample Collection	Variable speed peristaltic pump		
	Variable speed submersible pump		
	Variable speed bladder pump		
	Bailer with lanyard (See Table FS 2200-3)		
Filtration To the Color of the	Variable speed peristaltic pump		
	Variable speed submersible pump		
	Variable speed bladder pump		
	Pressurized bailer		
	1.0 μm high capacity molded filter		
	Electronic sensor		
Groundwater Eevel	Chalked tape		

# Table FS 2200-2 Dissolved Oxygen Saturation

TEMP	D.O.	mg/L	TEMP	D.O.	mg/L	TEMP	D.O.	mg/L	TEMP	D.O.	mg/L
deg C	SAT.	20%	deg C	SAT.	20%	deg C	SAT.	20%	deg C	SAT.	20%
15.0	10.084	2.017	19.0	9.276	1.855	23.0	8.578	1.716	27.0	7.968	1.594
15.1	10.062	2.012	19.1	9.258	1.852	23.1	8.562	1.712	27.1	7.954	1.591
15.2	10.040	2.008	19.2	9.239	1.848	23.2	8.546	1.709	27.2	7.940	1.588
15.3	10.019	2.004	19.3	9.220	1.844	23.3	8.530	1.706	27.3	7.926	1.585
15.4	9.997	1.999	19.4	9.202	1.840	23.4	8.514	1.703	27.4	7.912	1.582
15.5	9.976	1.995	19.5	9.184	1.837	23.5	8.498	1.700	27.5	7.898	1.580
15.6	9.955	1.991	19.6	9.165	1.833	23.6	8.482	1.696	27.6	7.884	1.577
15.7	9.934	1.987	19.7	9.147	1.829	23.7	8.466	1.693	27.7	7.870	1.574
15.8	9.912	1.982	19.8	9.129	1.826	23.8	8.450	1.690	27.8	7.856	1.571
15.9	9.891	1.978	19.9	9.111	1.822	23.9	8.434	1.687	27.9	7.842	1.568
16.0	9.870	1.974	20.0	9.092	1.818	24.0	8.418	1.684	28.0	7.828	1.566
16.1	9.849	1.970	20.1	9.074	1.815	24.1	8.403	1.681	28.1	7.814	1.563
16.2	9.829	1.966	20.2	9.056	1.811	24.2	8.387	1.677	28.2	7.800	1.560
16.3	9.808	1.962	20.3	9.039	1.808	24.3	8.371	1.674	28.3	7.786	1.557
16.4	9.787	1.957	20.4	9.021	1.804	24.4	8.356	1.671	28.4	7.773	1.555
16.5	9.767	1.953	20.5	9.003	1.801	24.5	8.340	1.668	28.5	7.759	1.552
16.6	9.746	1.949	20.6	8.985	1.797	24.6	8.325	1.665	28.6	7.745	1.549
16.7	9.726	1.945	20.7	8.968	1.794	24.7	8.309	1.662	28.7	7.732	1.546
16.8	9.705	1.941	20.8	8.950	1.790	24.8	8.294	1.659	28.8	7.718	1.544
16.9	9.685	1.937	20.9	8.932	1.786	24.9	8.279	1.656	28.9	7.705	1.541
17.0	9.665	1.933	21.0	8.915	1.783	25.0	8.263	1.653	29.0	7.691	1.538
17.1	9.645	1.929	21.1	8.898	1.780	25.1	8.248	1.650	29.1	7.678	1.536
17.2	9.625	1.925	21.2	8.880	1.776	25.2	8.233	1.647	29.2	7.664	1.533
17.3	9.605	1.921	21.3	8.863	1.773	25.3	8.218	1.644	29.3	7.651	1.530
17.4	9.585	1.917	21.4	8.846	1.769	25.4	8.203	1.641	29.4	7.638	1.528
17.5	9.565	1.913	21.5	8.829	1.766	25.5	8.188	1.638	29.5	7.625	1.525
17.6	9.545	1.909	21.6	8.812	1.762	25.6	8.173	1.635	29.6	7.611	1.522
17.7	9.526	1.905	21.7	8.794	1.759	25.7	8.158	1.632	29.7	7.598	1.520
17.8	9.506	1.901	21.8	8.777	1.755	25.8	8.143	1.629	29.8	7.585	1.517
17.9	9.486	1.897	21.9	8.761	1.752	25.9	8.128	1.626	29.9	7.572	1.514
18.0	9.467	1.893	22.0	8.744	1.749	26.0	8.114	1.623	30.0	7.559	1.512
18.1	9.448	1.890	22.1	8.727	1.745	26.1	8.099	1.620	30.1	7.546	1.509
18.2	9.428	1.886	22.2	8.710	1.742	26.2	8.084	1.617	30.2	7.533	1.507
18.3	9.409	1.882	22.3	8.693	1.739	26.3	8.070	1.614	30.3	7.520	1.504
18.4	9.390	1.878	22.4	8.677	1.735	26.4	8.055	1.611	30.4	7.507	1.501
18.5	9.371	1.874	22.5	8.660	1.732	26.5	8.040	1.608	30.5	7.494	1.499
18.6	9.352	1.870	22.6	8.644	1.729	26.6	8.026	1.605	30.6	7.481	1.496
18.7	9.333	1.867	22.7	8.627	1.725	26.7	8.012	1.602	30.7	7.468	1.494
18.8	9.314	1.863	22.8	8.611	1.722	26.8	7.997	1.599	30.8	7.456	1.491
18.9	9.295	1.859	22.9	8.595	1.719	26.9	7.983	1.597	30.9	7.443	1.489

Derived using the formula in Standard Methods for the Examination of Water and Wastewater, Page 4-101, 18th Edition, 1992

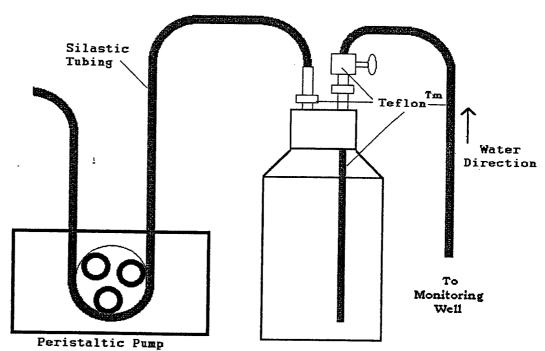
### Table FS 2200-3 Allowable Uses for Bailers

	Purging (Not				
ANALYTE GROUP(S)	Recommended)	SAMPLING			
GROUP(S)	Use:	Use:	Not Recommended:		
Volatile Organics Extractable Organics Radionuclides, including Radon Metals Volatile Sufides	If allowed by permit, program, contract or order or If operated by a skilled individual with documented training in proper techniques. Field documentation must demonstrate that the procedure in FS 2213, section 4 was followed without deviation.	If concentrations exceed action levels, the purpose is to monitor effective treatment, and the FDEP program allows the use of bailers; or If specified by FDEP permit, program, contract or order. or If operated by a skilled individual with documented training in proper techniques and using appropriate equipment. Field documentation must demonstrate that the procedure in FS 2221, section 2 was followed without deviation.	If concentrations are near or below the stated action levels; or  If a critical decision (e.g., clean closure) will be made based on the data; or  If data are to demonstrate compliance with a permit or order.		
Petroleum Hydrocarbons (TRPH) & Oil & Grease	If allowed by permit, program, contract or order or If operated by a skilled individual with documented training in proper techniques. Field documentation must demonstrate that the procedure in FS 2213, section 4 was followed without deviation.	Only if allowed by permit, program, contract or order as samples should be collected into the container without intermediate devices.	Unless allowed by permit, program, contract or order.		

### Table FS 2200-3 Allowable Uses for Bailers

ANALYTE GROUP(S)	Purging (Not Recommended)	SAMPLING			
OKOOF (3)	Üse:	Use	Not Recommended:		
Biologicals	If allowed by permit,	If all analytes collected	Before collecting any		
Inorganic Non- Metallics	program, contract or order	from the well can be collected with a bailer;	analytes that must be collected with a pump.		
Aggregate	or	or			
Organics	If operated by a skilled	If collected <u>after</u>			
Microbiological	individual with documented training in	collecting all analytes that require the use of			
Physical and	proper techniques.	a pump.			
Aggregate	Field documentation				
Properties	must demonstrate that the procedure in FS 2213, section 4 was followed without deviation.				
Ultra-Trace Metals	Never	Never			

Figure FS 2200-1
Pump and Trap for Extractable Organics



The sample container is a glass bottle threaded to use either a permanent Teflon lined cap or a sampling cap with a Teflon insert similar to the design above.

For ready reference in the District Offices, we are including a notebook (along with the paper copy of this memo) that contains all documents that were incorporated by reference into the new rule. A copy has also been placed in the Tallahassee DEP Library. This notebook should be made available to anyone who wishes to review any of the material that was incorporated by reference in the rule.

The new QA Rule more clearly states DEP's expectations for laboratory and field performance. The new Rule also delineates criteria for assessing data acceptability, enabling programs to make decisions concerning data usability and quality, which are based on their program Data Quality Objectives. The new SOPs reflect improvements in technology, cover additional topics, and are better organized than the previous versions. I have asked Dr. Bill Coppenger, Chief of the Bureau of Laboratories, to provide support to DEP programs in several areas related to the QA Rule. Our primary emphasis will be on delivering scientific training (field SOPs and data consumer education), performing audits (laboratory, field, and data review), and providing program-specific scientific and technical support. I encourage you to have staff contact either Bill or Russ Frydenborg, Administrator of the Environmental Assessment Section, to request assistance in these areas.

You may also visit the Bureau of Laboratories' website, <a href="http://www.dep.state.fl.us/labs/qa/index.htm">http://www.dep.state.fl.us/labs/qa/index.htm</a>, for comprehensive information about the QA Rule, a link to DEP field Standard Operating Procedures, and for the complete text of the Rule.

Thank you.

#### DEP-SOP-001/01

### Florida Department of Environmental Protection GROUNDWATER SAMPLING LOG

SITE JAME:					<del></del>	SITE	A 1,	<del></del>				
WELL N	iO:			SAMPL	LE ID:	LOCATION	<u>1:</u>			DATE:		
					PUR	RGING DA	ATA		<del></del>			
WELL DIAMETE 1 WELL V	ER (in): VOLUME (ga	ai) = (TOTAL WE	DEDT	L WELL 'H (ft): H – DEPTH T	TO WATEI		TATIC DEP O WATER O CAPACITY			WELL CAPACI	CITY (gal/ft):	
PURGE		= (		- PURGE		) X	PURGE	=				
METHOD	D: VOLUME	CUMUL.	PURGE	INITIATE	DAT:	_ <b></b>	ENDED A			TOTAL PURGE	L VOL. SED (gal):	
TIME	PURGED (gal)		RATE (gpm)	TO WATER (ft)	На	TEMP. (°C)	COND. (µmhos)	, OXY	SOLVED YGEN ng/L)		COLOR	ODOR
						+		-				-
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		-						1				i
		·						+				
	-	+						1				
VELL CA	PACITY (Gall	lons per Foot):	0.75" = 0.0	J2; 1" = 0.0	)4; 1 <u>.25"</u> =	= 0.06; 2"=	= 0.16; 3"	= 0.37;	4" = 0.65	5; 5" = 1.02; 6"	" - 1 47 12	5 RR
					SAMP	LING DA	ATA		<u></u>	1 0 - 1.0-1 -	= 1.4/, :=	= 5.00
AFFILIATIO		T			SA	AMPLER(S) IGNATURE(	)					<u> </u>
SAMPLING METHOD(	(S):				SA	AMPLING IITIATED AT				SAMPLING ENDED AT:		
	CONTAMINAT		N	FIELC	D-FILTERE		' N	<u> </u>		ENDED AT: DUPLICATE:	Υ	N
	SAMPLE CON SPECIFICAT MATERIAL	ATION				SERVATIO				INTENDED	ANAI YSIS	
NO.	CODE	VOLUME		SERVATIVE USED		TAL VOLUME FINAL D IN FIELD (mL) pH			<del></del>	AND/OR M		
					+							
				<del></del>	+							
			+									
					1							
EMARKS:	<u></u>											
REMARKS:		G = AMBER GLA	ASS; CG	= CLEAR (	BLASS; F	PE = POLYE	THYLENE	E; O=C	OTHER (	SPECIFY)		

NOTE: The above do not constitute all of the information required by Chapter 62-160, F.A.C.

## BROWNFIELDS ASSESSMENT. OCALA, FLORIDA FOIA 2019-003937

## BROWNFIELDS ASSESSMENT. OCALA, FLORIDA FOIA 2019-003937

BRIEF DESCRIPTION	
Appen 1-6	

## APPENDIX I-6 FS - SOIL

#### FS 3000. SOIL

See also the following Standard Operating Procedures:

- FA 1000 and 2000 Administrative Procedures
- FC 1000 Cleaning/Decontamination Procedures
- FD 1000-9000 Documentation Procedures
- FM 1000 Field Planning and Mobilization
- FQ 1000 Field Quality Control Requirements
- FS 1000 General Sampling Procedures
- FT 1000 General Field Testing and Measurement

#### 1. INTRODUCTION AND SCOPE

- 1.1. Use these SOPs during field investigations to collect soil samples that are representative of current site conditions. It is very important to ensure that the collected samples are neither altered nor contaminated by sampling and handling techniques.
- 1.2. The following topics include: equipment choice, equipment construction materials, grab and areal or depth composite sampling techniques. Sample collection methods fall into three general depth classifications: surface, shallow subsurface, and deep subsurface. Once the samples are acquired, the handling procedures are very similar and are described below.

#### 2. GENERAL

- 2.1. Select sampling equipment based on the type of sample to be collected and the analytes of interest. Choose soil sampling locations such that a representative portion of the soil is collected with minimal disturbance. Locations where natural vegetation is stressed or dead and/or areas that have surficial soil staining may be indicative of improper waste disposal practices.
- 2.2. If background and/or quality control sampling is warranted and feasible as determined in the site's work plan or by the project manager, select an upgradient, undisturbed location for obtaining the background and/or quality control samples. Be aware that differences in soil types may affect these background samples (e.g., sands vs. clays).
- 2.3. **Do not collect** samples for chemical analysis from auger flights or cuttings from hollow stem auger flights, except for waste characterization purposes for disposal.
- 2.4. Do not use samples that are collected for geological/lithological or vapor meter determinations for chemical analyses.

#### 3. EQUIPMENT AND SUPPLIES

- 3.1. All equipment must be constructed of materials consistent with the analytes of interest. Refer to FS 1000, Table FS 1000-3 for selection of appropriate equipment.
- 3.2. For information on sample container size and construction, see FS 1000, Table FS 1000-6.
- 3.3. For information on sampling equipment cleaning requirements, see FC 1000.

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### FS 3000 Soil

- 3.4. For information on preservation and holding time requirements, see FS 1000, Table FS 1000-6.
- 3.5. For information on documentation requirements, see FD 1000.

#### 4. PROCEDURES FOR COMPOSITING

- 4.1. The following is not a complete discussion regarding all available sampling protocols nor the appropriateness or inappropriateness of compositing soil samples. The appropriateness of compositing soil samples will depend on the data quality objectives of the project. However, it is sometimes advantageous to composite soil samples and thus minimize the number of samples to be analyzed when sampling highly contaminated areas. Obtain permission from the FDEP program.
  - 4.1.1. Select sampling points from which to collect each aliquot.
  - 4.1.2. Using the appropriate sampling technique, collect equal aliquots (same sample size) from each location and place in a properly cleaned container.
  - 4.1.3. Do not mix sample aliquots before containerizing.
  - 4.1.4. Record the amount of each aliquot (volume or weight).
  - 4.1.5. Label container, preserve on wet ice to 4°C and complete field notes.
  - 4.1.6. Notify the laboratory that the sample is an unmixed composite sample, and request that the sample be thoroughly mixed before sample preparation or analysis.
- 5. SPECIFIC PROCEDURES FOR VOLATILE ORGANIC COMPOUNDS

Follow the procedures specified in EPA Method 5035 for sample collection and sample preparation. The protocols listed below **do not replace Method 5035** but clarify and/or modify certain method procedures. Therefore, it is essential that all organizations have a copy of Method 5035 as a reference document.

#### 5.1. Container Preparation

- 5.1.1. All containers must be cleaned according to the FC 1000 sample container cleaning procedures for volatile organics.
- 5.1.2. Sample Vials: If sample vials are filled in the field, they must be provided with all reagents, stirring devices, label **and vial cap** to be used during sample analysis. These vials must be preweighed by the laboratory and records must be maintained so that there is an unambiguous link between the tare weight and the filled sample vial.

#### 5.2. <u>Collection Procedure</u>

- 5.2.1. The sample vials (when used) will contain a premeasured amount of liquid. The laboratory must weigh the vials before sending into the field, and must weigh them again after receipt. Therefore:
  - Do not lose any of the liquid either through evaporation or spillage
  - Do not use a vial if some of the contents has spilled, or if it appears that some has leaked during transport
  - Use the laboratory-supplied container label for identification information. DO
     NOT apply any additional labels to the container

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- Do not interchange vial caps or septa
- 5.2.2. Minimize exposure to air by obtaining the sample directly from the sample source, using a coring device or a commercially designed sampling tool.
  - 5.2.2.1. The sample collection device must be designed to fit tightly against the mouth of the vial or be small enough to be inserted into the vial.
    - EnCore or equivalent sampling devices may be used.
    - Disposable plastic syringes with the syringe end cut off prior to sampling may only be used **once** per sampling location.
  - 5.2.2.2. Extrude the sample directly into the sample container.
- 5.2.3. Follow the method procedures for field transfer into the vial.
- 5.2.4. Procedures for determining the sample weight in the field are not required unless the project manager requires an accurate determination of the 5-gram sample size.
  - 5.2.4.1. If the vials are returned to the laboratory for weighing, the sampler must be proficient in estimating the requisite 5-gram weight necessary for each sample.
  - 5.2.4.2. If an accurate estimate of the 5-gram sample size is desired prior to starting sample collection activities, use a balance with a sensitivity of 0.1 gram. Check the balance calibration before each day's use with a set of weights that have been calibrated against NIST-traceable weights at least annually.
- 5.2.5. If the sampling device is transported to the laboratory with a sample, make sure the seals are intact, especially if collecting samples from sandy soils.
- 5.2.6. Collect at least two replicate samples from the same soil stratum and within close proximity to the original sample location.
- 5.2.7. Collect an additional aliquot of sample for screening and dry weight determinations.
- 5.3. Preservation (see FS 1000, Table FS 1000-7)
  - 5.3.1. Low Level (□ 200 µg/kg volatile organics)
    - 5.3.1.1. The method states the use of sodium bisulfate, which is an acid. Since Florida soils contain significant amounts of calcium carbonate that reacts with acids, FDEP does not recommend using this preservative.
    - 5.3.1.2. Properly pack the samples (see FS 2004, section 5), and place all samples on wet ice.
    - 5.3.1.3. An unpreserved sample (no acid) must be analyzed within 48 hours.
    - 5.3.1.4. An acid preserved sample has a 14-day holding time.
    - 5.3.1.5. An unpreserved sample in a vial with premeasured analyte-free water must be analyzed within 48 hours.
    - 5.3.1.6. Holding times for unpreserved samples in vial with premeasured analyte-free water may be extended to 14 days if the laboratory freezes the samples to 10°C within 48 hours of sample collection.
    - 5.3.1.7. If transported to the laboratory in a sealed coring device, the samples must be analyzed within 48 hours.

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- 5.3.1.8. Holding times for sealed coring device samples may be extended to 14 days if the laboratory extrudes the sample into the appropriate liquid, and freezes it to -10°C.
- 5.3.2. High Level (> 200 µg/kg volatile organics)
  - 5.3.2.1. Properly pack the samples (see FS 2004, section 5), and place all samples on wet ice.
  - 5.3.2.2. If transported to the laboratory in a sealed coring device, the samples must be analyzed within 48 hours.
  - 5.3.2.3. Holding times for sealed coring device samples may be extended to 14 days if the laboratory extrudes the sample into the appropriate liquid, and refrigerates it at 4°C.
  - 5.3.2.4. Samples that are place in methanol in the field have a 14-day holding time.
- 6. BULK SAMPLES: The collection of bulk samples will depend on the data quality objectives of the project.
  - 6.1. Do not composite or mix VOC samples unless required by the FDEP program or if mandated by a formal FDEP document (permit, order or contract).
  - 6.2. Select sampling points from which to collect each aliquot.
  - 6.3. Using the appropriate sampling technique, collect equal aliquots (same sample size) from each location and place in a properly cleaned container.
    - 6.3.1. Do not mix sample aliquots before containerizing.
    - 6.3.2. Pack soil tightly minimizing as much headspace as possible in the sample container.
    - 6.3.3. Cap container tightly with Teflon side facing sample.
  - 6.4. Record the amount of each aliquot (volume or weight) in the field notes.
  - 6.5. Label container. Refer to FS 1000, Table FS 1000-7 for preservation and holding time requirements.
  - 6.6. Notify the laboratory that the sample is an unmixed composite sample, and request that the sample be thoroughly mixed before sample preparation or analysis.

#### FS 3100. Surface Soil Sampling

Surface soil is generally classified as soil between the ground surface and 6-12 inches below ground surface.

- 1. Remove leaves, grass and surface debris from the area to be sampled.
- 2. Collect samples for volatile organic analyses as described in FS 3000, section 5.
- 3. Select an appropriate precleaned sampling device and collect the sample.
- 4. Transfer the sample to the appropriate sample container.
- 5. Clean the outside of the sample container to remove excess soil.
- 6. Label the sample container, place on wet ice to preserve to 4°C and complete the field notes.

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#### FS 3200. Subsurface Soil Sampling

Interval begins at approximately 12 inches below ground surface.

#### FS 3210. SAMPLE COLLECTION PROCEDURE

Use the following after the desired depth has been reached by one of the methods outlined in FS 3220.

- 1. Collect samples for volatile organic analyses as described in FS 3000, section 5.
- 2. For other analyses, select an appropriate precleaned sampling device and collect the sample.
- 3. Transfer the sample to the appropriate sample container.
- 4. Clean the outside of the sample container to remove excess soil.
- 5. Label the sample container, place on wet ice to preserve to 4°C and complete the field notes.

#### FS 3220. REACHING THE APPROPRIATE DEPTH

- 1. SHOVELS AND DIGGERS: Used for soils from approximately 12 inches to a point when using the implement becomes impractical.
  - 1.1. Dig a hole or trench to the required depth.
  - 1.2. Follow the sample collection procedures outlined in FS 3210.
- 2. BACKHOE: Used for soils from approximately 12 inches to a point when using the implement becomes impractical.
  - 2.1. Dig a trench to the appropriate depth.
  - 2.2. Expose the sample, in the trench, by using a precleaned spoon, spatula or equivalent to clean away the soil that came in contact with the backhoe bucket.
  - 2.3. Use a **second** precleaned utensil to actually collect the sample from the trench.
  - 2.4. Follow the procedures outlined in FS 3210 to collect the sample.
- 3. BUCKET AUGERS AND HOLLOW CORERS: Suitable to reach soils from approximately 12 inches to a point when using the implement becomes impractical.
  - 3.1. Push and rotate the auger into the soil until the bucket is filled.
  - 3.2. Addition of a non-contaminating sleeve may allow an undisturbed soil sample to be obtained.
    - 3.2.1. The device consists of a standard auger head with a removable sleeve, which is inserted into the auger barrel. In this case it is the sleeve, which fills with soil.
    - 3.2.2. Remove the sleeve from the auger and cap.
  - 3.3. If the auger hole is prone to collapse due to low cohesion in some soils, FDEP recommends inserting a temporary rigid PVC casing into the hole. The casing prevents hole collapse and minimizes cross-contamination between soil zones as the auger is advanced. After collecting the samples, remove the temporary casing (if used) and fill the hole filled with the excavated soil.

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- 3.4. Remove the sample from the sampler by pushing or scraping the soil with an appropriate precleaned utensil into an appropriately precleaned tray or aluminum foil.
- 3.5. Remove any portion of the sample that has been disturbed and discard.
- 3.6. Follow the sample collection procedures outlined in FS 3210.

NOTE: If a confining layer has been breached during sampling, grout the hole to land surface with Type-1 Portland cement. This requirement may be different throughout Florida; contact the local Water Management District office for local requirements.

- 4. SPLIT SPOON SAMPLER: Suitable for reaching soils from approximately 12 inches to depths greater than 10 feet.
  - 4.1. A split spoon sampler, useful for sampling unconsolidated soil, consists of two half cylinders (spoons) that fit together to form a tube approximately two feet in length and two inches in diameter.
    - 4.1.1. The cylindrical arrangement is maintained by a retaining head and bit rings that screw on at each end of the split spoon.
    - 4.1.2. The bit ring has beveled edges to facilitate sampling as the split spoon is forced into the ground.
    - 4.1.3. Advance the sampler using the weight of the drilling stem and rods or a mechanical hammer.
    - 4.1.4. Insert a catcher device in the head ring to prevent loss of unconsolidated sample during recovery.
  - 4.2. After retrieving the split spoon sampler, expose the soil by unscrewing the bit and head rings and splitting the barrel.
  - 4.3. If the recovery is enough to accommodate discarding a portion of the sample, discard the top and bottom two to three inches of the sample.
  - 4.4. For volatile organic compounds collect the sample immediately from the **center portion of the split spoon** using the procedures described in FS 3000, section 5.
  - 4.5. For other analyses, slice the sample from the center portion of the split spoon using a clean, decontaminated utensil.
  - 4.6. Select an appropriate precleaned sampling device and collect the sample.
  - 4.7. Transfer the sample to the appropriate sample container.
  - 4.8. Clean the outside of the sample container to remove excess soil.
  - 4.9. Label the sample container, place on wet ice to preserve to 4°C and complete the field notes.
- 5. DIRECT PUSH RIGS: May be used for depths greater than 10 feet below ground surface.
  - 5.1. <u>Liners</u>: The clear liners are used with direct push rigs. This method is appropriate only for unconsolidated materials. The sampling depth that can be achieved varies depending on the rig and the lithologies that are encountered. Typically, the rig operator will:
  - Place the liner inside the metal probe rod

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- Select a point holder with an opening appropriate for the site lithology and screw it on the probe rod
- Advance the rod a full rod length
- Retrieve the rod
- Remove the point holder
- Remove the liner, and
- Slice the liner to expose the soil.
- 5.2. After the liner has been sliced, follow the procedures outlined in FS 3220, collecting volatile organic samples (if needed) immediately after the liner is sliced.
- 5.3. If samples for organic vapor analysis screening are required, collect them by slicing the sample(s) using a clean, decontaminated utensil and place them in 8-ounce (preferred) or 16-ounce jars, immediately cover the opening with aluminum foil and screw on the lid ring. If the contamination is derived from petroleum products it is acceptable to use a clean gloved hand to transfer the sample(s) to the sample container(s).
- 5.4. For other analyses, slice the sample from the center portion of the split spoon using a clean, decontaminated utensil.
- 5.5. Select an appropriate precleaned sampling device and collect the sample.
- Transfer the sample to the appropriate sample container.
- 5.7. Clean the outside of the sample container to remove excess soil.
- 5.8. Label the sample container, place on wet ice to preserve to 4°C and complete the field notes.

#### 6. SHELBY TUBE SAMPLER

- 6.1. The Shelby tube sampler is used to sample unconsolidated soil and consists of a tube approximately 30 inches long and two inches (or larger) in diameter.
- 6.2. One end of the tube has edges beveled into a cutting edge. The other end can be mounted to an adapter, which allows attachment to the drilling rig assembly.
- 6.3. After drilling to the required depth with an auger or rotary drill bit, a soil sample is obtained through the auger or directly in the borehole.
- 6.4. Push the Shelby tube into the soil using the drilling rig's hydraulic ram or manually with a sledge hammer.
- 6.5. Remove the tube from the sampler head.
- 6.6. Extrude the sample from the Shelby tube.
- 6.7. Use a decontaminated utensil to remove any portion of the sample that has been disturbed.
- 6.8. Collect samples for volatile organics immediately from the center portion of the Shelby tube using the procedures described in FS 3000, section 5.
- 6.9. For other analyses, slice the sample from the center portion of the Shelby tube using a clean, decontaminated utensil.
- 6.10. Transfer the sample to the appropriate sample container.

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- 6.11. Clean the outside of the sample container to remove excess soil.
- 6.12. Label the sample container, place on wet ice to preserve to 4°C and complete the field notes.

#### 7. CORE BARREL

- 7.1. A standard core barrel is utilized when consolidated samples (such as limestone or dolomite) are to be sampled.
  - 7.1.1. The core barrel is a cylinder approximately three feet long and two inches in diameter.
  - 7.1.2. The barrel has a removable head ring with small embedded diamonds which allow the device to cut through rock or consolidated soil as the drilling rods are rotated.
- 7.2. Retrieve the sample core by unscrewing the head ring and sliding the sample into a precleaned container.
- 7.3. Use a decontaminated utensil to remove any portion of the sample that has been disturbed.
- 7.4. Remove the sample from the sampler (corer) with a precleaned tool.
- 7.5. Transfer the sample to the appropriate sample container.
- 7.6. Clean the outside of the sample container to remove excess soil.
- 7.7. Label the sample container, place on wet ice to preserve to 4°C and complete the field notes.

#### FS 3230. REFERENCES

- 1. U.S. Environmental Protection Agency, Region 4, <u>Environmental Investigations Standard Operating Procedures and Quality Assurance Manual</u>, May 1996.
- 2. U.S. Environmental Protection Agency, <u>Test Methods for Evaluating Solid Waste</u>, <u>Physical/Chemical</u> Methods EPA SW-846, Third Edition (November 1986) as amended by Update III (December 1996).

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## BROWNFIELDS ASSESSMENT. OCALA, FLORIDA FOIA 2019-003937

FOLDER NUMBER	BRIEF DESCRIPTION	
424-157	Appen -1-7	

# APPENDIX I-7 FT 1100 - FIELD MEASUREMENT OF HYDROGEN ION ACTIVITY (Ph)

## FT 1100. FIELD MEASUREMENT OF HYDROGEN ION ACTIVITY (PH)

#### Use in conjunction with:

- FT 1000 General Field Testing and Measurement
- FQ 1000 Field Quality Control Requirements
- FS 1000 General Sampling Procedures
- FD 1000 Documentation Procedures
- 1. EQUIPMENT AND SUPPLIES
  - 1.1. <u>Field Instrument</u>: Use any pH meter consisting of a potentiometer, a glass electrode, a reference electrode, and a temperature-compensating device.
    - 1.1.1. For routine fieldwork use a pH meter accurate and reproducible to at least 0.2-unit in the range of 0.0 to 14.0 units, and equipped with temperature-compensation adjustment.
    - 1.1.2. Advanced silicon chip pH sensors (with digital meters) may be used if demonstrated to yield equivalent performance to glass electrode sensors for the intended application.
  - 1.2. <u>Standards</u>: Purchased or laboratory-prepared standard buffer solutions of pH values that bracket the expected sample pH range. Use buffers with nominal values of 4.0, 7.0 and 10.0 units for most situations. If the sample pH is outside the range of 4.0 to 10.0, then use two buffers that bracket the expected range with the pH 7 buffer being one of the two buffers. Alternatively, prepare appropriate standards per table I in method SM4500-H<sup>+</sup>-B.
  - 1.3. Recordkeeping and Documentation Supplies:
    - Field notebook (w/ waterproof paper is recommended)
    - Field record forms (e.g., forms FD 9000-7, FD 9000-8, and FD 9000-9)
    - Indelible pens
- 2. CALIBRATION AND USE
  - 2.1. General Concerns
    - 2.1.1. Calibrate the meter at the base of operations or in the field. If the calibration is performed at the base of operations, check the instrument on-site, prior to use, since a calibration is likely to change during mobilization.
    - 2.1.2. The acceptance criterion for the initial calibration or the calibration check is a reading of the standard within +/- 0.2-unit of the expected value.
    - 2.1.3. On a weekly basis, check the calibration to ensure the % theoretical slope is greater than 90% (if applicable to your instrument type).
      - 2.1.3.1. Note the % slope in the calibration records.
      - 2.1.3.2. A % slope of less than 90% indicates a bad electrode that must be changed or repaired.

2.1.3.3. If % slope cannot be determined on your meter, or the manufacturer's optimum specifications are different, follow the manufacturer's recommendation for maintaining optimum meter performance.

#### 2.2. Interferences

- 2.2.1. Sodium at pH  $\geq$  10.0 units can be reduced or eliminated by using a low sodium error electrode.
- 2.2.2. Coatings of oils, greases, and particles may impair the electrode's response. Pat the electrode bulb dry with lint-free paper or cloth and rinse with de-ionized water. For cleaning hard-to-remove films, use acetone very sparingly so that the electronic surface is not damaged.
- 2.2.3. Temperature effects on the electrometric measurement of pH are controlled by using instruments having temperature compensation or by calibrating the meter at the temperature of the samples.
- 2.2.4. Poorly buffered solutions with low specific conductance (< 200  $\mu$ mhos/cm) may cause fluctuations in the pH readings. Equilibrate electrode by immersing in several aliquots of sample before taking pH.
- 2.3. <u>Calibration</u>: Follow the manufacturer's calibration instructions specific to your meter. Most instruments allow for a two-point calibration and a few models can perform a three-point calibration. Use the appropriate number of standard buffer solutions for calibration. Do not reuse buffers after they have been in contact with the probe or sensor.
  - 2.3.1. Check the battery before mobilizing and turn on the meter when you reach the first site or facility and allow it to equilibrate to ambient temperature.
  - 2.3.2. Follow the calibration quality control procedures specified in FT 1000, section 2.2.
  - 2.3.3. Calibrate the meter/electrode system with at least two buffers. Always use a pH 7 buffer first. The second buffer must be at least three pH units (4 or 10) and must bracket the expected sample pH. Check historical data for expected pH or use narrow-range pH paper on an aliquot to estimate.
  - 2.3.4. If the pH sample range is expected to be wider than 3 pH units (e.g., some samples at pH 4 and others at pH 8), then add a third calibration point (buffer must be at least 4 or 10 pH units). If the instrument cannot be calibrated with three buffers, calibrate the instrument on the range that is expected and used the third buffer as a calibration check on the range.
    - 2.3.4.1. To be acceptable, a calibration check must be within +/- 0.2 pH unit of the stated buffer value. For example, if checking the pH 4.0 buffer, the result must be in the 3.8 to 4.2 range.
  - 2.3.5. To obtain an accurate reading, align the needle of the pH meter with its image in the mirror on the gauge. For a digital meter, round the result to one decimal figure (e.g., 7.6 instead of 7.57 units).
  - 2.3.6. Rinse the probe with de-ionized water (DI) before and between each standard buffer solution.
- 2.4. <u>Measuring Sample pH</u>: After an acceptable initial calibration or calibration check, follow these procedures to take a pH reading of a freshly collected sample.

## FT 1100 Field Measurement of Hydrogen Ion Activity (pH)

- 2.4.1. Pour enough of the fresh sample into a clean cup to take the reading.
- 2.4.2. Place the pH electrode in the sample (in the cup) and swirl the electrode.
- 2.4.3. Wait for stabilization, and read the pH value.
  - 2.4.3.1. In the case of low specific conductance and meter drift, add 1 mL of 1M KCI (potassium chloride) solution to each 100 mL of sample, swirl and read pH.
  - 2.4.3.2. Note: to make 1M KCl solution, take 74.55 g of primary standard grade KCl and add it to a 1-liter volumetric flask. Add DI to the 1-liter line on the flask and mix. Solutions of the appropriate strength may be purchased from commercial laboratory suppliers.
- 2.4.4 Turn the meter off after the last sample reading, rinse the electrode thoroughly with de-ionized water and replace the electrode's cap.
- 2.4.5. In-Situ pH of Samples: After calibrating the multi-probe sensors (e.g., in Hydrolab or YSI meters) as outlined in 2.3 above, follow the meter's instructions to select the display for reading the pH of the sample.
- 2.4.6. Immerse the probe at the desired depth in the water and wait at least thirty seconds for stabilization of the reading (record the value when the difference between two readings taken ten seconds apart is not greater than 0.2 unit).
- 2.5. <u>Flow-through Cells</u>: When using a flow-through cell, the procedure described above in section 2.4.6 is applicable.
- 3. PREVENTIVE MAINTENANCE: Refer to FT 1000, section 3.
- 4. RECORDS: See FT 1000, section 4 for additional details.
  - 4.1. <u>Calibration</u>: Record all calibration information (initial and continuing) in the field notebook <u>or</u> on a form specifically designed for this purpose (e.g. FD 9000-8). This information must be recorded:
    - 4.1.1. The calibration method (or SOP) and the type of standard(s) (including the concentrations) used.
    - 4.1.2. Record each calibration check (initial, continuing or final) in the permanent field records (or calibration logs). At a minimum, these records must include:
      - 4.1.2.1. Date, time and location (e.g., monitoring well MW-X; laboratory; etc.) of each calibration check;
      - 4.1.2.2. Individual performing the check;
      - 4.1.2.3. Results of each check, including the concentration/type of standard, expected reading, and the actual reading;
    - 4.1.3. Whether the check met or failed acceptance criteria;
    - 4.1.4. Readings associated with a failed check; and
    - 4.1.5. Corrective actions associated with failed check (such as recalibration, removal from use, etc.).
    - 4.1.6. Optionally, enter the meter name, model number, and identification number (if applicable).

## FT 1100 Field Measurement of Hydrogen Ion Activity (pH)

- 4.2. <u>Samples</u>: Record the sample results on the appropriate field parameter sheets (e.g., Form FD 9000-7) <u>or</u> in a field notebook. For each sample record the following information:
  - Project Name
  - Date and time the measurement was collected
  - Location of the sample (description, monitor well number, etc.)
  - Analyte Name
  - Reporting Units
  - Sample Value
  - Initials of the person taking the measurements.
- 4.3. Reagent and Standards Documentation: Maintain documentation on calibration standards (e.g., buffers, KCl) and other reagents.
  - 4.3.1. At a minimum, note the date of receipt, expiration dates (on the bottle label), and date of first use (on the standard container).
  - 4.3.2. Follow expiration dates: If any standard or chemical is used after the expiration date, there must be documentation showing that the reagent is providing an acceptable response.

#### FT 1110. REFERENCES

- 1. U.S. Environmental Protection Agency, <u>EPA 180.1</u>, <u>Methods for the Chemical Analysis of Water and Waste</u>, EPA-600/4-79-020, Revised 1983.
- 2. American Public Health Association, American Water Works Association, Water Pollution Control Federation, <u>SM 4500-H<sup>+</sup>, Standard Methods for the Examination of Water and Wastewater</u>, 20<sup>th</sup> Edition, 1999.

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## FT 1100 Field Measurement of Hydrogen Ion Activity (pH)

#### Appendix FT 1100 Tables, Figures and Forms

Form FD 9000-7 Field Parameter Data Sheet for Surface Water

Form FD 9000-8 Field Instrument Calibration Records

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DEP-SC 7-1/01

FT 1100 Field Measureme. J. Jdrogen Ion Activity (pH)

Field Parameter Data Sheet for Surface Water SAMPLERS:

SURVEY/PROJECT:

METER#

Pag

PAI STATION	R. DATE	E	ME	TOTAL	SAMPLE	WATER TEMP	00	%SAT	COND	SÁLINITY	H.	TURBIDITY
NUMBER DESCRIPTION UNIT	yy/mm/dd	-	hr.min	feet	feet	Celsius	mg/L	%	m2/cm	ppt	ns	UTN
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FIELD CONDITIONS FOR STATION#	AT	AT TIME	-	_								
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PREVIOUS RAINFALL:			WIND SP	EED (MP	VIND SPEED (MPH/KNOTS)			W	Wave Conditions:	JONS:		

Note: This Sheet is used for recording Sample Data – Calibration information must also be documented (see FT 1100, section 4)

DEP-SOP-001/01	Pageof
FT 1100 Field Measurement of Hydrogen Ion Activity (pH)	900,
Field Instrument Calibration Records	
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PARAME								
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Standa	ard B							
Standa	ard C							
DATE (yy/mm/dd)	TIME (hr.min)	STD:, (A, B, C)	STD:	INSTRUMEN RESPONSE	T	CALIBRATED (YES; NO)	TYPE (INIT, CONT)	SAMPLER
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## BROWNFIELDS ASSESSMENT. OCALA, FLORIDA FOIA 2019-003937

FOLDER NUMBER	BRIEF DESCRIPTION	T
424-151	Affen - 1-8	

## APPENDIX I-8 FT 1200 - MEASUREMENT OF SPECIFIC CONDUCTIVITY

## FT 1200. FIELD MEASUREMENT OF SPECIFIC CONDUCTANCE (CONDUCTIVITY)

Use in conjunction with:

- FT 1000 General Field Testing and Measurement
- FQ 1000 Field Quality Control Requirements
- FD 1000 Documentation Procedures
- 1. INTRODUCTION: Specific conductance is a useful method to approximate the total amount of inorganic dissolved solids.
  - 1.1. Conductivity varies with temperature. For example, the conductivity of salt water increases 3%/degree C at 0°C, and only 2 %/degree C at 25°C.
  - 1.2. Record the sample temperature or adjust the temperature of the samples prior to measuring specific conductance if the conductivity instrument does not employ automatic temperature compensation and correction of the instrument display value.

#### 2. EQUIPMENT AND SUPPLIES

- 2.1. <u>Field Instrument</u>: Any self-contained conductivity instrument suitable for field work, accurate and reproducible to 5% or better over the operational range of the instrument, and preferably equipped with temperature-compensation adjustment. See references in FT 1210 below for additional information about instruments.
- 2.2. <u>Standards</u>: Purchased or laboratory-prepared standard potassium chloride (KCI) solutions with conductivity values that bracket the expected samples' range. In the laboratory, prepare standards of appropriate conductivities per SM2510. See FT 1210, section 2 below.
- 2.3. Recordkeeping and Documentation Supplies:
  - Field notebook or,
  - Field record forms (e.g., forms FD 9000-7, FD 9000-8 and FD 9000-9)

#### 3. CALIBRATION AND USE

#### 3.1. General Concerns

- 3.1.1. For instruments without automatic temperature compensation, attempt to adjust the temperature of the samples to 25°C. If the temperature cannot be adjusted, record the temperature, correct for temperature (per section 3.4 below) and report the results corrected to 25°C. See references in FT 1210 below for further information about temperature correction.
- 3.1.2. Temperature measurement devices used to manually or automatically correct conductivity measurements must be calibrated per FT 1400.

#### 3.2. <u>Calibration</u>

- 3.2.1. <u>Initial Calibration</u>: Calibrate the meter prior to use according to the following steps:
  - 3.2.1.1. Follow the instrument manufacturer's calibration instructions.

Page 1 of 7

- 3.2.1.2. Use two standard potassium chloride solutions that bracket the range of expected sample conductivities.
- 3.2.1.3. Calibrate the instrument with the first standard.
- 3.2.1.4. Check the calibration of the instrument with the second standard, bracketing the range of expected sample values.
- 3.2.1.5. If the instrument can be calibrated with more than one standard, choose additional calibration standards within the range of expected sample values. The second standard in section 3.2.1.4 above may be used as an additional calibration standard.
- 3.2.2. Acceptability: Accept the calibration if the meter reads within +/- 5% of the value of any calibration standard used to check the calibration. For example, the acceptance range for a 100  $\mu$ mhos/cm standard is 95 to 105  $\mu$ mhos/cm. If the meter does not read within +/- 5% of each calibration check standard, determine the cause of the problem and correct before proceeding.
- 3.2.3. <u>Temperature Correction</u>: Most field instruments read conductivity directly. If the meter does not automatically correct values to 25°C, calculate correction factors using the procedure in section 3.4 below. Record all readings and calculations in the calibration records.
- 3.2.4. <u>Continuing calibration</u>: Check the meter with at least one KCI standard with a specific conductance within the range of conductivity measured in environmental samples. The reading for the calibration check must also be within +/- 5% of the standard value (see 3.2.2 above).
  - 3.2.4.1. If new environmental samples are encountered outside the range of the initial calibration in 3.2.1 above, check the instrument calibration with 2 standards bracketing the expected range of sample values. If these calibration checks fail, recalibrate the instrument as in 3.2.1.
- 3.2.5. Quality Control: Follow the calibration quality control procedures and frequency of calibrations specified in FT 1000, section 2.2.
  - 3.2.5.1. More frequent calibration checks may be required for discharge permit compliance measurements or other regulatory requirements.
- 3.3. <u>Measuring Specific Conductance of Samples</u>:
  - 3.3.1. Follow manufacturer's instructions for sample measurement.
  - 3.3.2. Immerse or place the conductivity probe or sensor in situ at a measuring location representative of the sampling source.
  - 3.3.3. Allow the conductivity instrument to stabilize.
  - 3.3.4. Measure the water temperature (if necessary for manual temperature compensation) and record the temperature. See FT 1400 for temperature measurement procedures.
  - 3.3.5. If the meter is equipped with manual temperature compensation, adjust the conductivity meter to the water temperature per manufacturer's instructions.
  - 3.3.6. If the conductivity meter has a set of positions that multiply the reading by powers of ten in order to measure the full range of potential conductivities, set this dial to the correct range in order to take a reading.

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#### FT 1200 Field Measurement of Specific Conductance

- 3.3.7. Record the sample conductivity measurement reading.
- 3.3.8. Rinse off the probe with de-ionized water. Follow manufacturer's instructions for probe storage between use.

#### 3.4 Calculations for Temperature Compensation

If the meter does not automatically correct for temperature (manual or automatic adjustment), or if a probe with a cell constant other than 1 is used, the following formula must be used to normalize the data to 25°C:

$$K = (K_m)(C)$$
1 + 0.0191(T-25)

Where:  $K = \text{conductivity in } \mu \text{mhos/cm at } 25^{\circ}\text{C}$ 

 $K_m$  = measured conductivity in  $\mu$ mhos/cm at T degrees C

C = cell constant

T = measured temperature of the sample in degrees C

If the cell constant is 1, the formula for determining conductivity becomes:

$$K = (K_m)$$
  
1 + 0.0191(T-25)

Refer to SM2510B, 20<sup>th</sup> edition, if other calculations (i.e., determining cell constant, etc.) are required. See FT 1210 below.

- 3.5 <u>In-Situ Measurements at Depth or With Flow-through Cells</u>: After calibrating the instrument as outlined in 3.2 above, follow the manufacturer's instructions to measure the conductivity of the sample.
  - 3.5.1. For in-situ measurements immerse the probe at the desired depth and wait for stabilization of the reading and record its value. Follow a similar procedure when using a flow-through cell.
    - 3.5.1.1 Preferably measure groundwater sample conductivity in-situ with a downhole probe or in a flow-through system.
- 4. PREVENTATIVE MAINTENANCE: Refer to FT 1000, section 3.
- 5. RECORDS: See FT 1000, section 4 for additional details.
- 5.1. Calibration:

Record all calibration information (initial and continuing) in a field notebook, on a form specifically designed for this purpose (e.g., FD 9000-8) or in other records, to include:

- Standard concentrations used
- Results of each calibration check, including expected reading for the calibration standard and actual reading obtained from the instrument
- Date, time and location (e.g., sample site, laboratory; etc.) of each calibration check
- Individual performing the check
- Whether the check met or failed acceptance criteria

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- Sample readings associated with a failed check, either by direct listing or link to other records
- Corrective actions associated with failed check (such as recalibration, removal from use, etc.)
- Meter name, model number, and identification number (if applicable)

#### 5.2. Samples:

Record the sample results on the appropriate field parameter sheets (e.g., Form FD 9000-7), field notebook or other records, to include:

- Project name
- Date and time the measurement was collected
- Location of the sample (description, monitor well number, etc.)
- Parameter name<sup>s</sup>
- Reporting units
- Sample measurement value
- Indentification of operator taking the measurements

#### 5.3. Reagent and Standards Documentation

Maintain documentation on calibration standards.

- 5.3.1. Note the standard value, vendor, lot number, date of receipt, expiration date and date of first use.
- 5.3.2. Observe and follow the expiration dates. If any standard is used after the expiration date, there must be documentation showing independent verification that the standard is providing an acceptable response.

#### FT 1210. REFERENCES

- 1. U.S. Environmental Protection Agency, <u>EPA120.1</u>, <u>Methods for the Chemical Analysis of Water and Waste</u>, <u>EPA-600/4-79-020</u>, Revised 1983.
- 2. American Public Health Association, American Water Works Association, Water Pollution Control Federation, <u>SM2510</u>, <u>Standard Methods for the Examination of Water and Wastewater</u>, 20<sup>th</sup> Edition, 1999.
- 3. American Society for Testing and Materials, <u>ASTM, D1125-95 (Reapproved 1999), Standard Test Methods for Electrical Conductivity and Resistivity of Water</u>
- 4. U.S. Geological Survey, <u>National Field Manual for the Collection of Water-Quality Data</u>, <u>Book 9, Chapter A6, Field Measurements, Section 6.3, Specific Electrical Conductance</u>, Techniques of Water-Resources Investigations, 4/98

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#### Appendix FT 1200 Tables, Figures and Forms

Form FD 9000-7 Field Parameter Data Sheet for Surface Water

Form FD 9000-8 Field Instrument Calibration Records

Page 5 of 7

FT 1200 Field Measurement of Specific Conductance Field Parameter Data Sheet for Surface Water

SAMPLERS:

SURVEY/PROJECT:

METER#

TURBIDITY 82078 NTO Ŧ 400 ns COND | SALINITY 480 ppt WAVE CONDITIONS: TIDAL STAGE: µS/cm 94 NSAT DO 301 % 00 mg/L 299 WATER Celsius 9 WIND SPEED (MPH/KNOTS): TOTAL SAMPLE DEPTH DEPTH feet 89 WIND DIRECTION: 81903 feet TIME hr:min DATE AT TIME yy/mm/dd 73672 PARAMETER STORET CODE LIND FIELD CONDITIONS FOR STATION# PREVIOUS RAINFALL: CLOUD COVER (%): STATION : NUMBER

Note: This Sheet is used for recording Sample Data – Calibration information must also be documented (see FT 1100, section 4)

Form FD 9000-7 (June 1, 2001)

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#### FT 1200 Field Measurement of Specific Conductance Field Instrument Calibration Records

INSTRUMENT (MAKER/MO	DDEL#) INSTRUMENT #
PARAMETER: [check only	
☐ TURBIDITY ☐ RES	NDUCTIVITY SALINITY PH ORP  SIDUAL CL DO OTHER  pe(s) of standards used for calibration, the origin of the standards, the standard swere prepared or purchased!
Standard A	
Standard B	
Standard C	

DATE (yy/mm/dd)	TIME (hr:min)	STD (A, B, C)	STD VALUE	INSTRUMENT RESPONSE	% DEV	CALIBRATED	TYPE	SAMOLE
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## BROWNFIELDS ASSESSMENT. OCALA, FLORIDA FOIA 2019-003937

FOLDER NUMBER	BRIEF DESCRIPTION	
424-157	Allen 1-9	

## APPENDIX I-9 FT 1400 - FIELD MEASUREMENT OF TEMPERATURE

## FT 1400. FIELD MEASUREMENT OF TEMPERATURE

Use this SOP in conjunction with the following DEP SOPs:

- FT 1000 General Field Testing and Measurement
- FQ 1000 Field Quality Control Requirements
- FD 1000 Documentation Procedures
- 1. EQUIPMENT AND SUPPLIES
  - 1.1. <u>Field Instruments</u>: Use any of the following instrument types for performing field measurements:
  - Digital thermistor (thermocouple type) and meter typical of field instruments
  - Glass bulb, mercury-filled thermometer (not recommended for field ruggedness)
  - Glass bulb, alcohol-filled thermometer with protective case
  - Bi-metal strip/dial-type thermometer
  - Advanced silicon chip temperature sensor and digital meter
    - 1.1.1. Field instruments must be capable of measuring temperature in  $0.1^{\circ}\text{C}$  increments.
  - 1.2. <u>Standard Thermometer</u>: NIST-traceable Celsius certified thermometer with scale marks for every 0.1°C increment, a range of 0°C to 100°C (or a range bracketing expected sample temperatures) and correction chart supplied with certification.
  - 1.3. Recordkeeping and Documentation Supplies:
    - Field notebook or forms (e.g., forms FD 9000-7, FD 9000-8 and FD 9000-9)
- 2. CALIBRATION AND USE
  - 2.1. General Concerns
    - 2.1.1. Select a temperature measuring device meeting the requirements of section 1.1 above.
    - 2.1.2. Dial-type and thermocouple-type devices with meters are preferred over the glass thermometers for fieldwork because of their durability and ease of reading.
      - 2.1.2.1. Transport glass thermometers in protective cases.
      - 2.1.2.2. Inspect glass thermometers for liquid separation. Do not use a thermometer if the liquid has separated.
      - 2.1.2.3. Most instruments with digital display will provide more decimal figures than are significant. Record the temperature reading with only one rounded decimal figure (e.g., 25.9 instead of 25.86°C).
  - 2.2. <u>Calibration</u>
    - 2.2.1. See FT 1000 for required frequency of initial calibration and calibration checks.
      - 2.2.1.1. Other field-testing measurements requiring temperature compensation necessitate calibration of the temperature field measurement device according to this SOP.

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### FT 1400 Field Measurement of Temperature

- 2.2.2. Check all thermistor (meter) devices and field thermometers against the NIST-traceable standard thermometer at several temperatures in the expected sample measurement range, using any correction factor indicated by the certificate supplied with the NIST-traceable thermometer.
  - 2.2.2.1. See the reference in FT 1410, section 3 below for additional guidance about making temperature comparisons with the standard thermometer.
  - 2.2.2.2. Make note of the calibration in the calibration records. See section 4, below.
  - 2.2.2.3. The field measurement device may be used with a linear correction factor provided that the observed temperature difference with the standard thermometer is documented at incremental temperatures over the range of expected sample temperatures. See the reference in FT 1410, section 3 below for further guidance about correction factors.
  - 2.2.2.4 Use the resulting correction factor when making temperature measurements of samples with the field measurement device.
  - 2.2.2.5 Prominently display the correction factor on the field measurement device, with the date last checked. A calibration correction curve or plot may also be used.
  - 2.2.2.6 Properly dispose of glass-bulb thermometers that do not meet the above calibration acceptance criteria.
- 2.2.3. <u>Continuing Calibration Checks</u>: See FT 1000 for required frequency of continuing calibration checks.
  - 2.2.3.1. The maximum time between continuing calibration checks (continuing calibration verification) can be extended beyond one month if verified by historical data for calibration checks for the specific field temperature measurement device.
  - 2.2.3.2. Check the field measurement device against the standard NIST-traceable thermometer as in section 2.2.2 2.2.2.6 above.
- 2.2.4. Refer to additional calibration requirements in FT 1000, section 2.2.
- 2.2.5. More frequent calibration checks may be required for discharge permit compliance measurements or other regulatory requirements.

#### 2.3. <u>Measuring Sample Temperature</u>

- 2.3.1. Insert or place the thermometer or sensor in situ at a measuring location representative of the sampling source.
- 2.3.2. Allow the thermometer or temperature sensor to equilibrate to ambient in-situ temperature.
  - 2.3.2.1. Groundwater samples must be measured in-situ with a downhole probe or in a flow-through system. Do not measure bailed or pumped samples in an intermediate container containing static sample.
- 2.3.3. Record the temperature to the nearest 0.1°C when the reading stabilizes and remains constant.
- 3. PREVENTIVE MAINTENANCE: Refer to FT 1000, section 3.
- 4. RECORDS: See FT 1000, section 4 for additional details.

### FT 1400 Field Measurement of Temperature

#### 4.1. <u>Calibration records</u>

Document all calibration information (initial and continuing), to include the following:

- Details of the method used to compare the field measurement device to the NIST-traceable standard thermometer (see guidance in the reference listed in FT 1410, section 3 below)
- Temperature values at which calibrations were checked
- Date, time and location of each calibration check
- Analyst or operator performing the check
- Results of each calibration check, including the expected reading (per the NIST traceable standard thermometer) and the actual reading of the field measurement device, using any established correction factors
- Whether the check met or failed acceptance criteria
- Corrective actions associated with failed check (such as new correction factor, removal from use, etc.)
- Field measurement meter or thermometer name, model number, and identification number (if applicable)

#### 4.2. Sample measurement records

Document sample measurement results as follows:

- Project name
- Date and time the measurement was performed
- Location of the sample (description, monitor well number, etc.)
- Parameter name
- Reporting units
- Sample measurement temperature value
- Identification of the operator taking the measurements

#### FT 1410. REFERENCES

- 1. U.S. Environmental Protection Agency, <u>EPA170.1</u>, <u>Methods for the Chemical Analysis of Water and Waste</u>, <u>EPA-600/4-79-020</u>, Revised 1983.
- 2. American Public Health Association, American Water Works Association, Water Pollution Control Federation, <u>SM2550</u>, <u>Standard Methods for the Examination of Water and Wastewater</u>, 20<sup>th</sup> Edition, 1999.
- 3. U.S. Geological Survey, <u>National Field Manual for the Collection of Water-Quality Data</u>, <u>Book 9, Chapter A6, Field Measurements, Section 6.1, Temperature</u>, Techniques of Water-Resources Investigations, 4/98

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# FT 1400 Field Measurement of Temperature

# Appendix FT 1400 Tables, Figures and Forms

Form FD 9000-7 Field Parameter Data Sheet for Surface Water

Form FD 9000-8 Field Instrument Calibration Records

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METER#

SAMPLERS:

Field Parameter Data Sheet for Surface Water FT 1400 Field Measu. Junt of Temperature

SURVEY/PROJECT:

TURBIDITY 82078 N Note: This Sheet is used for recording Sample Data – Calibration information must also be documented (see FT 1100, section 4) 400  $\mathbb{F}$ SC SALINITY 480 ppt COND WIND SPEED (MPH/KNOTS): uS/cm 9 %SAT DO WIND DIRECTION: 301 % mg/L 20 299 WATER TEMP Celsius 9 TOTAL SAMPLE DEPTH DEPTH feet 68 81903 feet TIME hr:min DATE AT TIME yy/mm/dd 73672 TIDAL STAGE: PARAMETER STORET CODE LIND WAVE CONDITIONS: FIELD CONDITIONS FOR STATION# STATION PREVIOUS RAINFALL: CLOUD COVER (%): STATION NUMBER

# FT 1400 Field Measurement of Temperature Field Instrument Calibration Records

INSTRU	MENT (	MAKER/M	ODEL#) _			INST	RUMENT#_	
PARAM	ETER:	[check only	one]				VOINIENI #_	-
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(yy/mm/do	) (hr:min	STD: (A, B, C)	STD	INSTRUMEN RESPONSE	T % DEV	CALIBRATED	TYPE (INIT, CONT)	
						(120, 110)	MULTICONIT)	INITIALS
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- 18 Gary Maddox, e-mail to Frances Hartnett, subject: "River Rise" definition, July 18, 2000.
- 19 T.R. Kincaid, abstract: The Relationship Between Cave Development and Spring/Aquifer Protection, presented at Florida Springs Conference, February 8-10, 2000, Gainesville, Florida.
- 20 P.L. Butt, A.W. Hayes, T.L. Morris, and W.C. Skiles, abstract: Results of the Rose Creek Swallet to Ichetucknee Springs Dye Trace Study August to September, 1997, presented at Florida Springs Conference, February 8-10, 2000, Gainesville, Florida.
- 21 R.W. Dean, abstract: Surface and Ground Water Mixing in a Karst Aquifer: An Example from the Floridan Aquifer, presented at Florida Springs Conference, February 8-10, 2000, Gainesville, Florida.
- 22 David Hornsby, Rob Mattson, and Tom Mirti, Surfacewater Quality and Biological Monitoring Annual Report, 1999, Suwannee River Water Management District.
- 23 Russel Frydenborg and T.F. Frick, *Biological Communities in Spring-Dominated Streams*, a slide presentation offered at the Florida Springs Conference, February 8-10, 2000, Gainesville, Florida.
- 24 website, http://www.ianr.unl.edu/pubs/water/nf49.htm, viewed 8/23/00.
- 25 Tom Morris, abstract: A Review of Florida Aquatic Cave Biology and Possible Threats to Endemic Cave Fauna, presented at Florida Springs Conference, February 8-10, 2000, Gainesville, Florida.
- 26 Kent Smith and R.R. Mezich, abstract: Manatees and Florida Springs: Habitat for the Future, presented at Florida Springs Conference, February 8-10, 2000, Gainesville, Florida.

# APPENDIX A – First Magnitude Springs of Florida

ler Legend	R/R = River Rise	M R = In the River	) G = Spring Group		PU = Private Uplands	CM = County Mgt.	PM = Private Mgt.	C = City or County	P = Private	S = State	F = Federal				T	Ī <sub>o</sub>	T
Owner		S/CM	3	PO	S		_	_	<u> </u>	<u> </u>	S	<u> </u>	S	4	<u>a</u>	MMD	ပ
Basin Delineation	Yes	Yes	S S	S S	Yes		No	S <sub>O</sub>	8	N <sub>O</sub>	Yes	8	2	8	8	N <sub>o</sub>	No
Basin- Work Group	2	2	:S	S <sub>0</sub>	Yes		S	S.	2	2	Yes	2	<sub>8</sub>	2€	S <sub>S</sub>	<b>№</b>	£
Monitoring Spr./Basin	No	S	No	So	Yes		Yes	Yes	Yes	Yes	Yes/Yes	Š	N <sub>o</sub>	S.	Yes	No No	Yes
Cave Mapped	2	Yes	ş	Š	Yes		2	Yes	2	£	N/a	Yes	S <sub>O</sub>	2	Yes	2	Yes
Nitrates mg/L	No Data	3.0	.16	No Data	1.0		.41	.53	.21	60.	.74	1.55	87.	1.38	.24	.40	1.41
Discharge Cfs	159	205	670	2003	390		406	352	306	150	361	117	442	370	809	288	162
Туре	9	SS	R/R	ŋ	SS		R/R	SS	SS	SS	၅	o.	R/R	R	R/R	R/R	SS
WMD	NWF	NWF	NWF	NWF	NWF		SR	SR	SR	SR	SR	SR	SR	SR	SR	SR	SR
County	Bay	Jackson	Leon	Wakulla	Wakulla	2	Alachua	Alachua	Columbia	Columbia	Columbia	Gilchrist	Columbia	Gilchrist	Hamilton	Hamilton	Lafayette
Spring	GAINER	JACKSON/BLUE	ST MARKS	SPRING CREEK	WAKULLA		ALA 112971	HORNSBY	COLUMBIA	COL 61981	ICHETUCKNEE	DEVILS EAR	SANTA FE RISE	SIPHON CREEK RISE	ALAPAHA RISE	HOLTON CREEK RISE	LAFAYETTE/BLUE

# BROWNFIELDS ASSESSMENT. OCALA, FLORIDA FOIA 2019-003937

FOLDER NUMBER		
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424-157	Appen 1-10	
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# APPENDIX I-10 FT 1500 - FIELD MEASUREMENT OF DISSOLVED OXYGEN

# FT 1500. FIELD MEASUREMENT OF DISSOLVED OXYGEN (DO)

Use in conjunction with:

- FT 1000 General Field Testing and Measurement
- FQ 1000 Field Quality Control Requirements
- FS 1000 General Sampling Procedures
- FD 1000 Documentation Procedures
- 1. EQUIPMENT AND SUPPLIES
  - 1.1. <u>Field Instrument</u>: a membrane/electrode DO meter, with polarographic or galvanic electrode, and a sensitivity that results in a precision of +/- 0.2 mg DO/L and an accuracy of +/- 0.2 mg DO/L. Temperature compensation must be done either automatically by the DO probe, or manually in accordance with SM 4500-O G. Temperature must also be calibrated in accordance with FT 1400.

### 1.2. Standards

- 1.2.1. NIST-traceable Celsius thermometer with a scale marked for every 0.1°C and a range of 0 to 100°C.
- 1.2.2. Access to an organization with capability to perform the Winkler titration procedure is recommended <u>but not mandatory</u>.
- 1.2.3. A "zero-DO standard", prepared on-site with an aliquot of the sample water, <u>is optional</u>. Prepare by adding excess sodium sulfite and a trace of cobalt chloride to bring the DO to zero.
- 1.3. Recordkeeping and Documentation Supplies:
  - Field notebook (w/ waterproof paper is recommended)
  - Field record forms (e.g., forms FD 9000-7, FD 9000-8 and FD 9000-9)
  - Indelible pens
- 2. Calibration and USE: the electrode method is predominantly used  $\underline{\text{in-situ}}$  for dissolved oxygen determinations.

### 2.1. General Concerns

- 2.1.1. Turbulence is necessary to keep a constant flow of water across the membrane-sample interface. Make sure the appropriate mechanism is working before using the probe.
- 2.1.2. Store the probe with a cover that creates a saturated atmosphere. A cap, with a wet sponge in it, will suffice for single-parameter probes. If the sensor is in a multi-probe device, keep the protective cap filled with water during storage.
- 2.1.3. Before mobilizing, check to make sure there are no bubbles beneath the probe membrane, or any wrinkles or tears in the probe membrane. If so, replace the membrane and KCl solution. Check the leads, contacts, etc. for corrosion and/or shorts if meter pointer remains off-scale, does not calibrate, or drifts.

Page 1 of 9

Revision Date: January 1, 2002

- 2.1.4. Dissolved inorganic salts interfere with the performance of DO probes. For example, DO readings in salt water are affected by the salinity and must be corrected. The DO meter may adjust automatically based on readings taken from the specific conductivity/salinity probe. If corrections are not automatic the appropriate calculations must be used to correct for salinity. If automatic adjustments are used the specific conductivity/salinity probe calibration must be checked or calibrated in accordance with FT1200.
- 2.1.5. Reactive gases, which pass through the membrane, may interfere. For example, chlorine will depolarize the cathode and cause a high probe output. Long-term exposures to chlorine will coat the anode with the chloride of the anode metal and eventually desensitize the probe. Sulfide (from H<sub>2</sub>S) will undergo oxidation if high enough potential (voltage) is applied, creating current flow, yielding faulty readings. If such interferences are suspected, change the membrane electrode more frequently and calibrate at more frequent intervals.

### 2.2. Calibration

- 2.2.1. Follow the quality control requirements for calibration (see FT 1000, section 2.2).
- 2.2.2. <u>Air Calibration and Checks</u>: before use, check the meter in water-saturated air to make sure it is properly calibrated and operating correctly. Make a similar check at the end of the day or sampling event. Follow the manufacturer's instructions for your specific instrument.
  - 2.2.2.1. Allow an appropriate warm up period before initial field calibration.
  - 2.2.2.2. Once the probe/calibration chamber is stable at ambient temperature, check the air temperature and determine, from the DO versus temperature table (See Table 1 Below) what the DO should measure. A stable and accurate temperature is required for a valid calibration.

### 2.3. Continuous Calibration

- 2.3.1. <u>Air-Calibration Chamber in Air</u>: DO sensor or instrument is calibrated against air that is saturated with water at a known temperature and ambient atmospheric pressure. Use table 1 to check calibration at specified temperature (*USGS TWRI Book 9 See Table 1*)
  - 2.3.1.1. Wet the inside of the calibration chamber with water-pour out the excess water (leave a few drops) and insert the sensor into the chamber (this ensures 100-percent humidity)
  - 2.3.1.2. Allow adequate time for the DO sensor and the air inside the calibration chamber to equilibrate.
  - 2.3.1.3. Measure the temperature in the calibration chamber and observe the readings until the instrument stabilizes.
  - 2.3.1.4. Use the oxygen solubility table 1 to determine the DO saturation at a measured temperature and atmospheric pressure.
  - 2.3.1.5. Compare DO meter reading with value obtained from table 1 to ensure continuous calibration

Table 1: Solubility of Oxygen in Water at Atmospheric Pressure<sup>1,2</sup>

Temperature	Oxygen Solubility	Temperature	Oxygen Solubility
°C	mg/L	°C	mg/L
0.0	14.621	26.0	8.113
1.0	14.216	27.0	7.968
2.0	13.829	28.0	7.827
3.0	13.460	29.0	7.691
4.0	13.107	30.0	7.559
5.0	12.770	31.0	7.430
6.0	12.447	32.0	7.305
7.0	12.139	33.0	7.183
8.0	11.843	34.0	7.065
9.0	11.559	35.0	6.950
10.0	11.288	36.0	6.837
11.0	11.027	37.0	6.727
12.0	10.777	38.0	6.620
13.0	10.537	39.0	6.515
14.0	10.306	40.0	6.412
15.0	10.084	41.0	6.312
16.0	9.870	42.0	6.213
17.0	9.665	43.0	6.116
18.0	9.467	44.0	6.021
19.0	9.267	45.0	5.927
20.0	9.092	46.0	5.835
21.0	8.915	47.0	5.744
22.0	9.743	48.0	5.654
23.0	8.578	49.0	5.565
24.0	8.418	50.0	5.477
25.0	8.263		

<sup>1.</sup> The table provides three decimal places to aid interpolation

- 2.4. <u>Additional Checks</u>: The following methods may be used as additional checks to verify calibration. These additional checks may be required as part of a specific permit.
  - 2.4.1. Winkler method (e.g. SM4500-0 C): this check is useful to assess the condition of the DO sensor (i.e., its degradation with time/use) and that the instrument can still maintain a valid calibration. (EPA Method# 360.2, and SM4500-O B)
    - 2.4.1.1. Following EPA Method# 360.2 or SM4500-O C when using the Winkler method is **necessary** for an accurate calibration check.
    - 2.4.1.2. Fill a clean bucket with uncontaminated or de-ionized water and place the probe into the bucket (with stirrer or equivalent mechanism turned off). Fill at least two biological oxygen demand (BOD) bottles without entraining atmospheric oxygen into the bottles. Carefully submerge the bottom of the bottle (one at a time) into the water and allow the water to fill the bottle. Place the bottle on the bottom of the

<sup>2.</sup> Under equilibrium conditions, the partial pressure of oxygen in air-saturated water is equal to that of the oxygen in water-saturated air

bucket and carefully place stopper into it without adding atmospheric oxygen. Retrieve the bottles and determine their DO by the Winkler method (see SM4500-O-B for more details). Turn the stirrer or equivalent mechanism on and read the DO of the water in the bucket.

- 2.4.1.3. Adjust the DO meter according to manufacturer's instructions. Be sure to adjust the meter to the temperature of water in the bucket, and then calibrate the DO meter to read the average DO concentration of the two samples determined by the Winkler test.
- 2.4.2. Zero-DO Check: The air calibration and the interfering effects of the sample can be further checked in the field by means of a "zero-DO standard" (SM 4500-O G.).
  - 2.4.2.1. Prepare this standard on-site with an aliquot of the sample by adding excess sodium sulfite and a trace of cobalt chloride to bring the DO to zero. Prepare this zero-DO standard in a beaker or a large-mouth sample container of appropriate size to insert the DO probe.
  - 2.4.2.2. After adding the chemicals, gently swirl the water and let it sit for about 30 seconds before inserting the probe.
  - 2.4.2.3. Read the DO of the sample. If the reading is outside the acceptance interval, the instrument must be recalibrated and/or zero-adjusted if the meter allows for this adjustment.
- 2.4.3. <u>Air-Saturated Water</u>: The DO sensor or instrument system is calibrated against water that is saturated with oxygen at a known temperature and ambient atmospheric pressure. (*USGS TWRI Book 9 See Table 1 above*)
  - 2.4.3.1. The temperature and Conductivity of water used for calibration should be about the same as the temperature and conductivity of the water to be measured.
  - 2.4.3.2. Place DO sensor and calibration water in a large beaker or open-mouth container.
  - 2.4.3.3. Aerate the water for an adequate amount of time.
  - 2.4.3.4. Determine if the water is 100 percent saturated with oxygen, and take a temperature reading (Temperature must be calibrated or check for accuracy before DO calibration check)
  - 2.4.3.5. Use table 1 above to determine the DO saturation value at the measured water temperature. Compare DO meter reading with value obtained from table 1 to ensure continuous calibration

# 2.5. Measuring DO in Samples:

- 2.5.1. Place the DO probe at the depth and location appropriate to what you are measuring.
  - 2.5.1.1. For example, take the DO of an effluent just before it enters the receiving water. If the effluent aerated prior to entering the surface water, take the DO reading in the receiving water right where it enters.
  - 2.5.1.2. For well mixed surface waters, e.g., fast flowing streams, take the DO reading at approximately 1-2 feet below the surface or at mid-depth.

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- 2.5.1.3. For still or sluggish surface waters, take a reading at one foot below the surface, one foot above the bottom, and at mid-depth.
- 2.5.1.4. If it is shallow, say less than two feet, take the reading at mid-depth.
- 2.5.1.5. Do not take a reading in frothy/aerated water since you may get a false reading.
- 2.5.1.6. For groundwater, if it is impractical to place the probe in the well, collect a sample with minimal aeration and measure the DO immediately upon collection. Use a low-flow pumping system with a flow-through cell for best results.
- 2.5.2. Rinse probe with de-ionized water and keep the probe in the saturated atmosphere (see 2.1.2 above) between sites and events.
- 2.5.3. If the readings show distinct, unexplainable changes in DO levels, or when the probe has been in waters with high sulfides, recalibrate using the Winkler method or perform maintenance per manufacturer's instructions. While taking a reading, if it is very low (e.g., below 1.0 mg/L), allow it to stabilize, record it and then, remove and rinse the probe, as the environment is very likely anoxic and may contain hydrogen sulfide, which can damage the probe.
- 2.5.4. Salinity and Temperature corrections may be necessary. Follow manufacturer instructions for automatic corrections or perform manual calculations (SM 4500-O G.).
- 3. PREVENTIVE MAINTENANCE: Refer to FT 1000, section 3.
- 4. RECORDS: See FT 1000, section 4 for additional details.
  - 4.1. <u>Calibration</u>: Record all calibration information (initial and continuing) in the field notebook <u>or</u> on a form specifically designed for this purpose (e.g. FD 9000-8). This information must be recorded:
    - 4.1.1. The calibration method (or SOP) and the type of standard(s) (including the concentrations) used.
    - 4.1.2. Record each calibration check (initial, continuing or final) in the permanent field records (or calibration logs). At a minimum, these records must include:
      - 4.1.2.1. Date, time and location (e.g., monitoring well MW-X; laboratory; etc.) of each calibration check;
      - 4.1.2.2. Individual performing the check;
      - 4.1.2.3. Results of each check, including the concentration/type of standard, expected reading, and the actual reading;
    - 4.1.3. Whether the check met or failed acceptance criteria;
    - 4.1.4. Readings associated with a failed check; and
    - 4.1.5. Corrective actions associated with failed check (such as recalibration, removal from use, etc.).
    - 4.1.6. Optionally, enter the meter name, model number, and identification number (if applicable).
  - 4.2. <u>Samples</u>: Record the sample results on the appropriate field parameter sheets (e.g., form FD 9000-7) or in a field notebook. For each sample record the following information:

- Project Name
- Date and time the measurement was collected
- Location of the sample (description, monitor well number, etc.)+
- Analyte Name
- Reporting Units
- Sample Value
- Initials of the person taking the measurements.
- 4.3. <u>Reagent and Standards Documentation:</u> Maintain documentation on calibration standards and other reagents.
  - 4.3.1. At a minimum, note the date of receipt, expiration dates (on the bottle label), and date of first use (on the standard container).
  - 4.3.2. Follow expiration dates: If any standard or chemical is used after the expiration date, there must be documentation showing that the reagent is providing an acceptable response.

### FT 1510. REFERENCES

- 1. U.S. Environmental Protection Agency, <u>EPA360.1 and 360.2</u>, <u>Methods for the Chemical Analysis of Water and Waste, EPA-600/4-79-020</u>, Revised 1983.
- 2. American Public Health Association, American Water Works Association, Water Pollution Control Federation, <u>SM4500-O-G</u>, <u>Standard Methods for the Examination of Water and Wastewater</u>, 20<sup>th</sup> Edition, 1999.
- 3. U.S. Geological Survey, TWRI, Book 9, 04/98.
- 4. American Society for Testing and Materials, <u>Annual book of ASTM Standards 2001</u>, Section 11 Water and Environmental Technology, Vol. 11.01

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Revision Date: January 1, 2002

# Appendix FT 1500 Tables, Figures and Forms

Form FD 9000-7 Field Parameter Data Sheet for Surface Water

Form FD 9000-8 Field Instrument Calibration Records

Pag

DEP-S-7-101 FT 1500 Field Measur. et. יו Dissolved Oxygen Field Parameter Data Sheet for Surface Mater

SAMPLERS: Field Parameter Data Sheet for Surface Water SURVEY/PROJECT:

METER#

TURBIDITY 82078 N Н 400 S SALINITY 480 ppt COND mS/cm 9 %SAT DO 301 % DO mg/L 299 WATER TEMP Celsius 6 TOTAL SAMPLE DEPTH? DEPTH feet 68 81903 feet TIME hr:min DATE yy/mm/dd 73672 PARAMETER STORET LIND STATION DESCRIPTION STATION NUMBER

Note: This Sheet is used for recording Sample Data – Calibration information must also be documented (see FT 1100, section 4)

WIND SPEED (MPH/KNOTS):

WIND DIRECTION:

AT TIME

FIELD CONDITIONS FOR STATION#

CLOUD COVER (%):

TIDAL STAGE:

WAVE CONDITIONS:

PREVIOUS RAINFALL:

### Field Instrument Calibration Records

INSTRUM	IENT (M			ou unient Can			UMENT#_	
		heck only						
	TEMPER	ATURE	CONE	DUCTIVITY	☐ SALINIT	ΓΥ □ pH		RP
	TURBIDIT	ΓY	RESI		□ DO		ER	
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Sta	andard A	1						
Sta	andard E	3						
Sta	andard (	<u> </u>						
DATE (yy/mm/dd)	TIME:	(A, B, C)	STD	INSTRUMENT RESPONSE	% DEV	CALIBRATED	1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1	
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# BROWNFIELDS ASSESSMENT. OCALA, FLORIDA FOIA 2019-003937

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# BROWNFIELDS ASSESSMENT. OCALA, FLORIDA FOIA 2019-003937

FOLDER NUMBER	BRIEF DESCRIPTION	
424-157	Appen 1-11	

# APPENDIX I-11 FT 1600 - FIELD MEASUREMENT OF TURBIDITY

# FT 1600. FIELD MEASUREMENT OF TURBIDITY

Use in conjunction with:

- FT 1000 General Field Testing and Measurement
- FQ 1000 Field Quality Control Requirements
- FS 1000 General Sampling Procedures
- FD 1000 Documentation Procedures
- 1. INTRODUCTION: Turbidity measures the scattering effect that suspended solids have on the propagation of light through a body of water (surface or ground waters). The higher the effect (i.e., intensity of scattered light), the higher the turbidity value. Suspended and colloidal matter such as clay, silt, finely divided organic and inorganic matter, and plankton and other microscopic organisms cause turbidity in water.

This SOP describes the use of true nephelometric measurement using instruments meeting the specifications of the cited methods (see references). The use of in-situ probes with turbidity sensors may be used for screening purposes only. Do not report their results for regulatory purposes.

### 2. EQUIPMENT AND SUPPLIES

- 2.1. <u>Field Instrument:</u> Use a turbidimeter (aka nephelometer) or a spectrophotometer consisting of a light source and one or more photoelectric detectors with a readout device to indicate the intensity of light. The instrument must meet these specifications:
  - 2.1.1. The light source must have a tungsten-filament lamp operated at a color temperature between 2000 and 3000°K.
  - 2.1.2. The distance traversed by the incident light and scattered light within the sample tube must not exceed 10 cm.
  - 2.1.3. The light detector, positioned at  $90^{\circ}$  to the incident light, must have an acceptance angle that does not exceed  $\pm 30^{\circ}$  from  $90^{\circ}$ .
  - 2.1.4. The detector and any filter system must have a spectral peak response between 400 and 600 nanometers.
  - 2.1.5. The instrument <u>sensitivity</u> must permit detection of a turbidity difference of 0.02 NTU at the 0 1.0 NTU scale.
  - 2.1.6. <u>Note</u>: using the appropriate equipment and following the procedures in this SOP, the field <u>accuracy</u> of this measurement is close to  $R = 100 \pm 10\%$  for turbidities in the range of 1 to 100 NTU.
- 2.2. <u>Sample Cells (cuvettes)</u>: Use sample cells or tubes of clear, colorless glass or plastic.
  - 2.2.1. Keep cells scrupulously clean, both inside and out, and discard if scratched or etched.
    - 2.2.1.1. Never handle them where the light beam strikes the sample.
    - 2.2.1.2. Clean sample cells by thorough washing with laboratory soap (inside and out) followed by multiple rinses with distilled or de-ionized water, and let air-dry.

- 2.2.2. Use a very thin layer of silicone oil on the outside surfaces to mask minor imperfections or scratches in the cells.
  - 2.2.2.1. Use silicone oil with the same refractive index of the glass; making sure the cell appear to be nearly dry with little or no visible signs of oil.
- 2.2.3. Because small differences between cells significantly impact measurement, use either matched pairs or the same cell for standardization and sample measurement.
- 2.3. <u>Standards</u>: Formazin stock suspension of 4,000 NTU, either prepared according to method SM 2130B, section 3.b, <u>or</u> of commercial origin. Use daily or working standards as outlined below. Do not use standards past their expiration dates.
  - 2.3.1. Working formazin standards: in the turbidity ranges of interest, prepare by diluting the 4,000 NTU stock standard with "high-quality dilution water" (nominal value of 0.02 NTU).
    - 2.3.1.1. Prepare this water by passing laboratory reagent-grade water through a filter with pore size of 0.1  $\mu$ m (rinse the collection flask at least twice with filtrate and discard the next 200 mL).
  - 2.3.2. <u>Secondary commercial standards</u>: use only those certified by the manufacturer to give equivalent calibrations to the primary standards and retain their certificates.
  - 2.3.3. <u>Primary or secondary Gel-type standards</u>: suspensions of microspheres of styrene-divinylbenzene (SDVB) copolymer that are as stable as the concentrated formazin and more stable than diluted formazin. These standards, available commercially, are also known as "gel-type" standards. They are recommended for field use.
- 2.4. Recordkeeping and Documentation Supplies:
  - Field notebook (w/ waterproof paper is recommended)
  - Field record forms (e.g., forms FD 9000-7, FD 9000-8 and FD 9000-9)
  - Indelible pens
- 3. CALIBRATION AND USE
  - 3.1. General Concerns
    - 3.1.1. Light absorption by dissolved and suspended matter may cause a negative bias on the turbidity measurement. When present in significant concentrations, particles of light-absorbing materials such as activated carbon will cause a negative interference. Likewise, the presence of dissolved, color-causing substances that absorb light may also cause a negative interference. Some commercial instruments may have the capability of either correcting for slight color interference or optically blanking out the color effect.
    - 3.1.2. Handle samples with natural effervescence as described in 3.3.5 below.

### 3.2. Calibration

- 3.2.1. Follow the quality control requirements for calibration (see FT 1000, section 2.2).
- 3.2.2. Calibrate the field instrument before use either at the base of operations or in the field. The acceptance criterion for the initial calibration or a calibration check depend on the range of turbidity of the standard value:
  - S= 0.1 10 NTU: the response must be within 10% of the standard;

- S= 11 40 NTU: the response must be within 8% of the standard:
- $\underline{S=41-100 \text{ NTU}}$ : the response must be within 6.5% of the standard; and
- <u>S > 100 NTU</u>: the response must be within 5% of the standard.
- 3.2.3. <u>Nephelometer Calibration</u>: Follow the manufacturer's operating instructions. Run at least one standard in each instrument range to be used in the field. Make certain that the instrument gives stable readings in all sensitivity ranges used.
- 3.2.4. Secondary standards (see 2.3.3 above) may be used to calibrate and/or check calibrations. Check secondary standards against a primary standard at least once per quarter.

### 3.3. Measuring Turbidity in Samples:

- 3.3.1. Gently agitate the sample and wait until air bubbles disappear.
- 3.3.2. Double-rinse the sample cell or cuvette with a small amount of the sample. Discard, and pour an aliquot into the sample cell or cuvette.
- 3.3.3. Gently dry out its external surface with lint-free paper.
- 3.3.4. Insert the cell in the instrument and read the turbidity directly from the meter display. Report turbidity measurements as follows:

Turbidity Range (NTU)	Report to Nearest (NTU)
0 – 0.1	0.05
1 – 10	0.1
10 – 40	1
40 – 100	5
100 – 400	10
400 – 1000	50
> 1000	100

- 3.3.5. Do not use vacuum degassing, ultrasonic bath or other devices to remove bubbles from the sample. If the sample contains visible bubbles or if it effervesces (as in groundwater, with changes in pressure and temperature), make a note of this in the field records and collect a sample for laboratory measurement.
  - 3.3.5.1. If effervescing samples are collected for laboratory analysis collect the sample without leaving headspace in the container and ship it as soon as possible to the laboratory (the holding time for this measurement is only 48 hrs). Ship this sample in wet ice at 4°C.
- 3.3.6. Pour out the sample, double-rinse the cuvette with de-ionized water in preparation for the next sample.
- 4. PREVENTIVE MAINTENANCE: Refer to FT 1000, section 3.
- 5. RECORDS: See FT 1000, section 4 for additional details.
  - 5.1. <u>Calibration</u>: Record all calibration information (initial and continuing) in the field notebook <u>or</u> on a form specifically designed for this purpose (e.g. FD 9000-8). This information must be recorded:

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- 5.1.1. The calibration method (or SOP) and the type of standard(s) (including the concentrations) used.
- 5.1.2. Record each calibration check (initial, continuing or final) in the permanent field records (or calibration logs). At a minimum, these records must include:
  - 5.1.2.1. Date, time and location (e.g., monitoring well MW-X; laboratory; etc.) of each calibration check;
  - 5.1.2.2. Individual performing the check;
  - 5.1.2.3. Results of each check, including the concentration/type of standard, expected reading, and the actual reading;
- 5.1.3. Whether the check met or failed acceptance criteria;
- 5.1.4. Readings associated with a failed check; and
- 5.1.5. Corrective actions associated with failed check (such as recalibration, removal from use, etc.).
- 5.1.6. Optionally, enter the meter name, model number, and identification number (if applicable).
- 5.2. <u>Samples</u>: Record the sample results on the appropriate field parameter sheets (e.g., Form FD 9000-7) <u>or</u> in a field notebook. For each sample record the following information:
  - Project Name
  - Date and time the measurement was collected
  - Location of the sample (description, monitor well number, etc.)
  - Analyte Name
  - Reporting Units
  - Sample Value
  - Initials of the person taking the measurements
- 5.3. Reagent and Standards Documentation: Maintain documentation on calibration standards (e.g., formazin, gel standards) and other reagents.
  - 5.3.1. At a minimum, note the date of receipt, expiration dates (on the bottle label), and date of first use (on the standard container).
  - 5.3.2. Follow expiration dates: If any standard or chemical is used after the expiration date, there must be documentation showing that the reagent is providing an acceptable response.

### FT 1610. REFERENCES

- 1. U.S. Environmental Protection Agency, <u>EPA 180.1</u>, <u>Methods for the Chemical Analysis of Water and Waste</u>, <u>EPA-600/4-79-020</u>, Revised 1983.
- 2. American Public Health Association, American Water Works Association, Water Pollution Control Federation, <u>SM 2130</u>, <u>Standard Methods for the Examination of Water and Wastewater</u>, 20<sup>th</sup> Edition, 1999.

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# טבר-סטר-טטווטו FT 1600 Field Measurement of Turbidity

3. U.S. Geological Survey, <u>National Field Manual for the Collection of Water-Quality Data;</u> <u>Techniques of Water-Resources Investigations, Book 9, Chapter 6.7,</u> 1998.

Revision Date: January 1, 2002

# Appendix FT 1600 Tables, Figures and Forms

Form FD 9000-7 Field Parameter Data Sheet for Surface Water

Form FD 9000-8 Field Instrument Calibration Records

Revision Date: January 1, 2002

Page

DEP-SC 1/01 FT 1600 Field Mes. בייב, FT 1600 Field Mes. בייבים

Field Parameter Data Sheet for Surface Water SAMPLERS:

SURVEY/PROJECT: \_

METER#

		PARAMETER	, DATE	TIME	TOTAL.	SAMPLE	WATER	ÇO:	%SAT DO	COND	SALINITY	Hd	TURBIDITY
STATION	STATION DESCRIPTION	TINO	yy/mm/dd	hr:min	feet	feet	Celsius	mg/L	%	mS/cm	ppŧ	ns	NTU
1 H		STORET CODE	73672		81903	68	10	299	301	94	480	400	82078
									-1				
											٠		
							-						
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FIELD CON	FIELD CONDITIONS FOR STATION#	#NOIT\	AT TIME	Щ									
CLOUD COVER (%):	VER (%):	TIDAL STAGE	1 E			:		WIND D	WIND DIRECTION:				
PREVIOUS	PREVIOUS RAINFALL:							WIND SI	PEED (MF	WIND SPEED (MPH/KNOTS):			
	WAVE CONDITIONS:	OITIONS:			-			A Comment					
					1:1-0		,				In acides of 1400 ET 4400 Allendarion Al	100 500	tion 41

Note: This Sheet is used for recording Sample Data - Calibration information must also be documented (see FT 1100, section 4)

### DEP-SOP-001/01 FT 1600 Field Measurement of Turbidity

### **Field Instrument Calibration Records**

NSTRUME	ENT (MA	KER/MOD	DEL#)			INSTRI	JMENT#	
ARAMET	ER: [cl	neck only c	ne]					
ПΤ	EMPERA	TURE	CONDI	JCTIVITY	☐ SALINI	TY 🗌 pH		
□т	URBIDIT	Y	☐ RESID	JAL CL		☐ OTHE	R	
				dards used fo red or purcha		the origin of the s	tandards, the s	tandard
Sta	ndard A							
Sta	ndard B				· · · · · · · · · · · · · · · · · · ·			
Sta	ndard C	•			•			
DATE (yy/mm/dd)	TIME	STD.: (A, B, C)	STD	INSTRUME RESPONS	NT 1	(YES, NO)	TYPE (INIT, CONT)	SAMPLER [NITIALS
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# BROWNFIELDS ASSESSMENT. OCALA, FLORIDA FOIA 2019-003937

FOLDER NUMBER	BRIEF DESCRIPTION	
424-157	Appen - 112	

# APPENDIX I-12 FT 1000 - GENERAL FIELD TESTING AND MEASUREMENT

# FT 1000. GENERAL FIELD TESTING AND MEASUREMENT

Use the following SOPs in conjunctions with FT 1000:

- FD 1000 Documentation Procedures
- FQ 1000 Field Quality Control Requirements
- FS 1000 General Sampling Procedures

### 1. INTRODUCTION

- 1.1. <u>Scope and Applicability</u>: SOPs FT 1100 to FT 3400 outline procedures to conduct field measurements that are commonly associated with sampling activities. They include the parameters that are measured in-situ or in a field sample by means of direct-reading instruments (meters connected to sensing probes).
  - 1.1.1. Included in SOPs FT 1100 to FT 2400 are:
    - 1.1.1.1. The parameters that fall under physical/chemical properties: pH, Conductivity, Salinity, Temperature and Dissolved Oxygen;
    - 1.1.1.2. The parameters that require some minimal chemistry to yield a measurable quantity (usually color) are Residual Chlorine and Sulfite. A freshly collected field sample is required for these two parameters; these measurements must be performed immediately or no longer than <u>fifteen minutes</u> from the time of collection; and
    - 1.1.1.3. Optical properties such as Turbidity, Secchi Depth and Transparency (also included in these SOPs).
    - 1.1.1.4. Others, less common parameters or procedures such as the measurement of Water Flow/Velocity, Sediment Oxygen Demand, Oxidation-Reduction Potential (ORP or Redox) and Habitat Assessments, fall under this category.
  - 1.1.2. FT 3000 to FT 3400 address aquatic habitat characterization.
  - 1.1.3. The above-mentioned SOPs involve the active participation and intervention of the sampling team and the results are either recorded by the individual making the measurement or stored electronically in a meter or a data-logger. Remotely operated meters and continuous monitoring devices are addressed in FT 1900. In the latter cases, the results are either transmitted by telemetry or recorded on-site by electronic means.
- 1.2. <u>Exclusions</u>: **Field-screening procedures are not addressed in these SOPs** because they do not yield data of quantifiable quality. The use of field screening, if and when useful and at the discretion of the site or project managers, must be addressed for each program or project in other documents dealing specifically with the planning and design of sampling events.
- 1.3. <u>Expectations and Requirements:</u>
  - 1.3.1. In some cases, specific instruments may be identified, with detailed instruction on their use. If you are using a different instrument, follow the manufacturer's instructions for assembly operation and maintenance.

# DEP-SOP-00 ועו האר FT 1000 General Field Testing and Measurement

- 1.3.2. When required, these SOPs outline the instrument specifications. A field instrument must meet the stated requirements.
- 1.3.3. These SOPs outline the calibration requirements for each method. Although instruments may vary in configuration or operation, these essential calibration requirements must be met.
- 2. MINIMUM CALIBRATION REQUIREMENTS: This section outlines the essential calibration and quality control measures that must be followed for each field instrument.
  - 2.1. <u>General Considerations</u>: Prior to mobilization, the <u>sampling personnel</u> must verify that all equipment is in proper working condition, calibrated, and that batteries are properly charged.
  - 2.2. Minimum Quality Control Requirements (see FQ 1310)
    - 2.2.1. To be acceptable, a field test result must be bracketed between acceptable calibration results. The first check may be an initial calibration, but the second must be a continuing verification check.
    - 2.2.2. Verify or calibrate each field instrument prior to use by following the applicable field measurement SOP.
    - 2.2.3. Verify the calibration at no more than 24-hour intervals during use and at the end of the use if the instrument will not be used the next day or any time period greater than 24 hours.
    - 2.2.4. All initial calibration and verification checks must meet the calibration acceptance criteria specified in the applicable field measurement SOP.
      - 2.2.4.1. If a verification check or initial calibration fails to meet acceptance criteria, immediately recalibrate the instrument using the applicable initial calibration procedure or remove it from service.
      - 2.2.4.2. If a calibration check fails to meet acceptance criteria and it is not possible to reanalyze the sample(s):
        - Report all results between the last acceptable calibration check and the failed calibration check as <u>estimated</u> (report the value with a "J");
        - Include a narrative description of the problem; and
        - Shorten the time period between verification checks or replace/repair the instrument.
    - 2.2.5. If historically generated data demonstrate that a specific instrument remains stable for longer periods of time, the time interval between initial calibration and calibration checks may be increased.
      - 2.2.5.1. All acceptable field data must be bracketed by acceptable checks (see section 2.2.1 above). Qualify data that are not bracketed by acceptable checks (see section 2.2.4.2 above).
      - 2.2.5.2. The maximum time interval is <u>one</u> month or at the conclusion of a sampling event, whichever is less.
      - 2.2.5.3. Base the selected time interval on the shortest interval that the instrument maintains stability. If an extended time interval is used, and the instrument consistently fails to meet the final calibration check, the instrument may need

maintenance to correct the problem; or the time period is too long and must be decreased.

- 2.2.6. For instruments that are deployed for extended periods of time, calibrate the instrument before deployment and verify the calibration at the end of the deployment.
  - 2.2.6.1. All acceptable field data must be bracketed by acceptable checks (see section 2.2.1 above) or the data must be qualified (see section 2.2.4.2 above).
  - 2.2.6.2. For continuous monitoring instruments, all acceptable field data must be bracketed by acceptable checks (see section 2.2.1 above), or the data must be qualified (see section 2.2.4.2 above).
- 3. PREVENTIVE MAINTENANCE: Record all maintenance and repair notes in the maintenance logbook for each meter (see FS 1007). If rental equipment is used, a log is not required. However, the origin (i.e., rental company), rental date, equipment type, model number and identification number (if applicable) must be entered into the field notes or a rental equipment notebook.

### 4. DOCUMENTATION

- 4.1. <u>Sample Documentation</u>: For each sample record the following information:
  - Project Name
  - Date and time the measurement was collected
  - Location of the sample (description, monitor well number, etc.)
  - Analyte Name
  - Reporting Units
  - Sample Value
  - Initials of the person taking the measurements.
- 4.2. <u>Field Calibration Documentation</u>: Field instrument calibration must be performed on a regular basis and calibration records must be kept on the field sheets, field logs or in a separate calibration log.
  - 4.2.1. The records must indicate the calibration method (or SOP), and the type of standard(s) (including the concentrations) that were used.
  - 4.2.2. Record each calibration check (initial, continuing or final) in the permanent field records (or calibration logs). At a minimum, these records must include:
    - 4.2.2.1. Date, time and location (e.g., monitoring well MW-X; laboratory; etc.) of each calibration check;
    - 4.2.2.2. Individual performing the check;
    - 4.2.2.3. Results of each check, including the concentration/type of standard, expected reading, and the actual reading;
  - 4.2.3. Whether the check met or failed acceptance criteria;
  - 4.2.4. Readings associated with a failed check; and
  - 4.2.5. Corrective actions associated with failed check (such as recalibration, removal from use, etc.).

- 4.2.6. Optionally, enter the meter name, model number, and identification number (if applicable).
- 4.3. <u>Reagent and Standards Documentation</u>: Maintain documentation on calibration standards (e.g., buffers, KCl) and other reagents.
  - 4.3.1. At a minimum, note the date of receipt, expiration dates (on the bottle label), and date of first use (on the standard container).
  - 4.3.2. Observe and follow the expiration dates.
    - 4.3.2.1. If any standard or chemical is used after the expiration date, there must be documentation showing that the reagent is providing an acceptable response.
  - 4.3.3. If reagents or standards are prepared from stock chemicals, they must be analytical reagent grade or better.
    - 4.3.3.1. Some reagents or standards may specify "**primary standard**". In such cases, purchase only the specified grade. Do not substitute an analytical grade chemical.

### FT 1010. REFERENCES

- 1. Florida Department of Environmental Protection, <u>DEP Standard Operating Procedures for</u> Laboratory Operations and Sample Collection Activities, <u>DEP-QA-001/92</u>, September 1992.
- 2. U.S. Environmental Protection Agency, Region 4, <u>Environmental Investigations Standard Operating Procedures and Quality Assurance Manual</u>, May 1996.

# Appendix FT 1000 Tables, Figures and Forms

Form FD 9000-8 Field Instrument Calibration Records

Form FD 9000-9 Field Instrument Maintenance Records

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# PEP-SOP-001/01 FT 1000 General Field Testing and Measurement

# Field Instrument Calibration Records

INSTRUMENT (MAKE/N	AODEL#)		INSTRUM	ENT#	
PARAMETER: [check of the characteristics of	☐ CONDUCTIVITY ☐ RESIDUAL CL	☐ SALINITY	□ рН □ ОТН	☐ ORP	
☐ TURBIDITY  STANDARDS: [Specify t values, and the date the stan	he type(s) of standards us	ed for calibration, t			standard
Standard A					
Standard B					
Standard C	D STD INSTRU	JMENT	CALIBRATED	TYPE	SAMPLER

DATE	ard C	STD	STD	INSTRUMENT	N DE .	CALIBRATED	TYPE (INIT, CONT)	SAMPLER INITIALS
yy/mm/dd)	(hr:min)	(A, B, C)	VALUE	RESPONSE	% DEV	(YES, NO)	(INT, CONT)	HALLO
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# DEP-SOP-001/01 FT 1000 General Field Testing and Measurement

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# Field Instrument Maintenance Records

STRUM	ENT (MA	KE/MODEL#)	INSTRUMENT #				
ATE OF	PURCH.	ASE:		(□ new; □ used)			
ARAMET	ren(s):	[check all that a	apply for th	is instrument]			
	PERATUR	RE CONDU	JCTIVITY	☐ SALINITY	☐ pH	ORP	
☐ TEMPERATURE ☐ CONDUCT			UAL CL	☐ DO	OTHER		
DATE TIME TYPE OF MAINTENANCE			DESC	CRIPTION OF PERFO	RMED MAINTE	SAMPLER INITIALS	
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